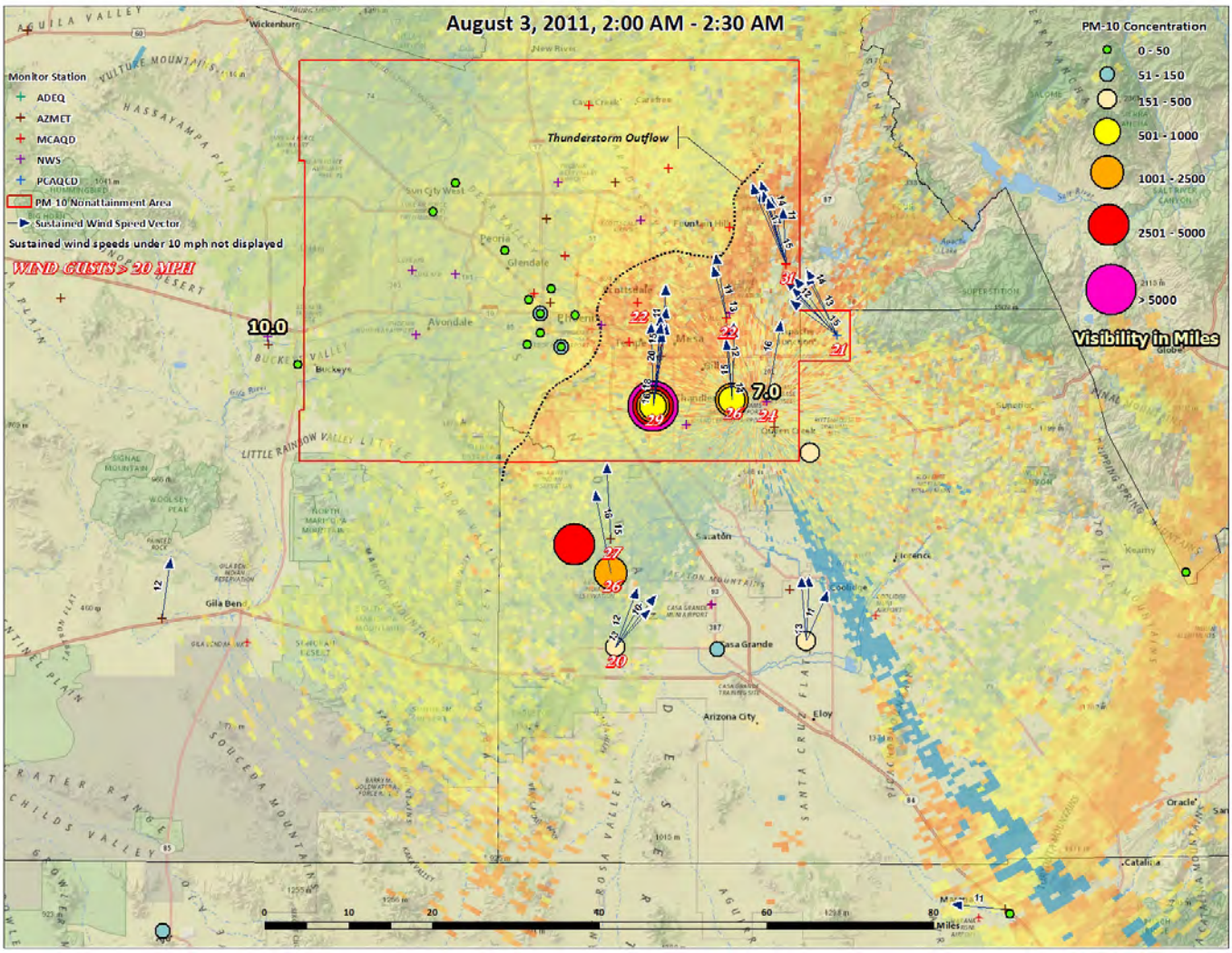
State of Arizona Exceptional Event Documentation for August 3, 2011, for the Phoenix PM10 Nonattainment Area

Produced by:

Arizona Department of Environmental Quality
Maricopa County Air Quality Department
Maricopa Association of Governments

Final Report
January 23, 2013



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I. EXCEPTIONAL EVENT RULE (EER) REQUIREMENTS

In addition to the technical requirements that are contained within the EER, procedural requirements must also be met in order for EPA to concur with the flagged air quality monitoring data. This section of the report lays out the requirements of the EER and associated guidance, and discusses how the Arizona Department of Environmental Quality (ADEQ) addressed those requirements.

Procedural Requirements

This section presents a review of the procedural requirements of the EER as required by 40 CFR 50.14 (Treatment of Air Quality Monitoring Data Influenced by Exceptional Events) and explains how ADEQ fulfills them. The Federal EER requirements include public notification that an event was occurring, the placement of informational flags on data in EPA's Air Quality System (AQS), the notification of EPA of the intent to flag through submission of initial event description, the documentation that the public comment process was followed, and the submittal of a demonstration supporting the exceptional events flag. ADEQ has addressed all of these procedural and documentation requirements.

Public notification that event was occurring (40 CFR 50.14(c)(1(i))

ADEQ issued Dust Control Action Forecasts and Ensemble Forecasts for the Greater Phoenix area advising citizens of the potential for high wind / dust events on August 3, 2011. More information on ADEQ's forecasting program can be found in Section IV. The forecast products that were issued for August 3, 2011 are included in Appendix A.

Place informational flag on data in AQS (40 CFR 50.14(c)(2)(ii))

ADEQ and other operating agencies in Arizona submit data into EPA's AQS. Data from both filter-based and continuous monitors operated in Arizona are submitted to AQS.

When ADEQ and/or another agency operating monitors in Arizona suspects that data may be influenced by an exceptional event, ADEQ and/or the other operating agency expedites analysis of the filters collected from the potentially-affected filter-based air monitoring instruments, quality assures the results and submits the data into AQS. ADEQ and/or other operating agencies also submit data from continuous monitors into AQS after quality assurance is complete.

If ADEQ and/or the operating agency have determined a potential exists that the monitor reading has been influenced by an exceptional event, a preliminary flag is submitted for the measurement in the AQS. The data are not official until they undergo more thorough quality assurance and quality control, leading to certification by May 1st of the year following the calendar year in which the data were collected (40 CFR 58.15(a)(2)). The presence of the flag can be confirmed in AQS.

Notify EPA of intent to flag through submission of initial event description by July 1 of calendar year following event (40 CFR 50.14(c)(2)(iii))

ADEQ submitted notice to EPA on August 28, 2012 listing all days from calendar year 2011 that ADEQ intends to analyze under the Exceptional Events Rule. The Exceedance that occurred on August 3, 2011,

within the Phoenix PM10 nonattainment area will be included on this list. This assessment report serves as both the initial notification to EPA of ADEQ's intention to flag these data, as well as the demonstration supporting the flagging of these data.

On August 3, 2011, one monitor within the boundaries of the Phoenix PM10 nonattainment area exceeded the 24-hour PM10 standard during the high wind event that occurred on that day. It was the West Chandler monitor (04-013-4004-81102-1) operated by MCAQD.

Document that the public comment process was followed for event documentation (40 CFR 50.14(c)(3)(iv))

ADEQ posted this assessment report on the ADEQ webpage and placed a hardcopy of the report in the ADEQ Records Management Center for public review. ADEQ opened a 30-day public comment period on December 3, 2012. A copy of the public notice certification, along with any comments received, will be submitted to EPA, consistent with the requirements of 40 CFR 50.14(c)(3)(iv). See Appendix C for a copy of the affidavit of public notice.

Submit demonstration supporting exceptional event flag (40 CFR 50.14(a)(1-2))

At the close of the comment period, and after ADEQ has had the opportunity to consider any comments submitted on this document, ADEQ will submit this document, the comments received, and ADEQ's responses to those comments to EPA Region IX headquarters in San Francisco, California. The deadline for the submittal of this demonstration package is September 30, 2014.

Documentation Requirements

Section 50.14(c)(3)(iii) of the EER states that in order to justify excluding air quality monitoring data, evidence must be provided for the following elements:

a. The event satisfies the criteria set forth in 40 CFR 501(j) that:
   (1) the event affected air quality,
   (2) the event was not reasonably controllable or preventable, and
   (3) the event was caused by human activity unlikely to recur in a particular location or was a natural event;
b. There is a clear causal relationship between the measurement under consideration and the event;
c. The event is associated with a measured concentration in excess of normal historical fluctuations; and
d. There would have been no exceedance or violation but for the event.

Section II of this assessment introduces the conceptual model of a thunderstorm outflow wind event that transpired on August 3, 2011, providing a background narrative of the exceptional event and an overall explanation that 'the event affected air quality'. Further evidence that 'the event affected air quality' is provided in Section V. Sections II and V also provide evidence that the event was a natural event.

Section IV of this assessment details the existing area control measures and demonstrates that despite the presence and enforcement of these controls, the event on August 3, 2011 was not reasonably controllable or preventable.

Section V of this assessment establishes a clear causal connection between the natural event on August 3, 2011 and the exceedance of the 24-hour PM10 standard at the West Chandler monitoring station. The evidence in this section (and the previous section on historical fluctuations) also confirms that the event in question both affected air quality and was the result of a natural event.

Section III of this assessment provides data summaries and time series graphs which help illustrate that the event on August 3, 2011 produced PM10 concentrations in excess of normal historical fluctuations.

Section VI of this assessment builds upon the demonstration showing a clear causal connection between the natural event and the exceedance and concludes there would have been no exceedance on August 3, 2011 but for the presence of the natural event.

II. CONCEPTUAL MODEL

Geographic Setting and Climate

Geographic Setting

Phoenix is located in the Salt River Valley in south-central Arizona. It lies at a mean elevation of 1,090 feet above mean sea level (msl) in the northeastern part of the Sonoran Desert. Other than the mountains in and around the city, the topography of Phoenix is generally flat. The Phoenix area is surrounded by the McDowell Mountains (~4,200 ft msl) to the northeast, the foothills of the Bradshaw (~7,900 ft msl) and Mazataal (~7,900 ft msl) ranges to the north, the White Tank Mountains (~4,500 ft msl) to the west, the Sierra Estrella (~4,450 ft msl) to the southwest, and the Superstition Mountains (~5,000 ft msl) far to the east. Within the City are the Phoenix Mountains (~2,600 ft msl) and South Mountain (~2,600 ft msl). Current development is pushing north, west, and south into Pinal County. The Phoenix metropolitan area contains a fairly dense network of PM10 monitors throughout the area, with a much less dense network of monitors located throughout the rest of the state. Figure 2–1 shows the general geographic setting of Phoenix, as well as the locations of PM10 monitors throughout the state. It should be noted that some of the monitors shown in Figure 2-1 are filter-based monitors; therefore, monitoring data from all locations may only be available for select days (i.e. 1-in-6 run days).

Figure 2–2 depicts the drainage systems or watersheds for the State of Arizona. Many of the rivers that form Arizona's drainage system are dry for most of the year and, consequently, are sources of silt and fine soils that become suspended and add to regional PM10 loadings during high wind events. Much of this alluvial matter and fine soil is deposited in the low lying areas of central and southern Arizona, with larger depositional areas focused in and around the confluences of dry river channels.

Figure 2-1. Phoenix Geographic Setting and PM10 Monitor Locations (source: EPA AQS DataMart, NASA MODIS Satellite, Google Earth). PM10 monitor locations are indicated by white markers.

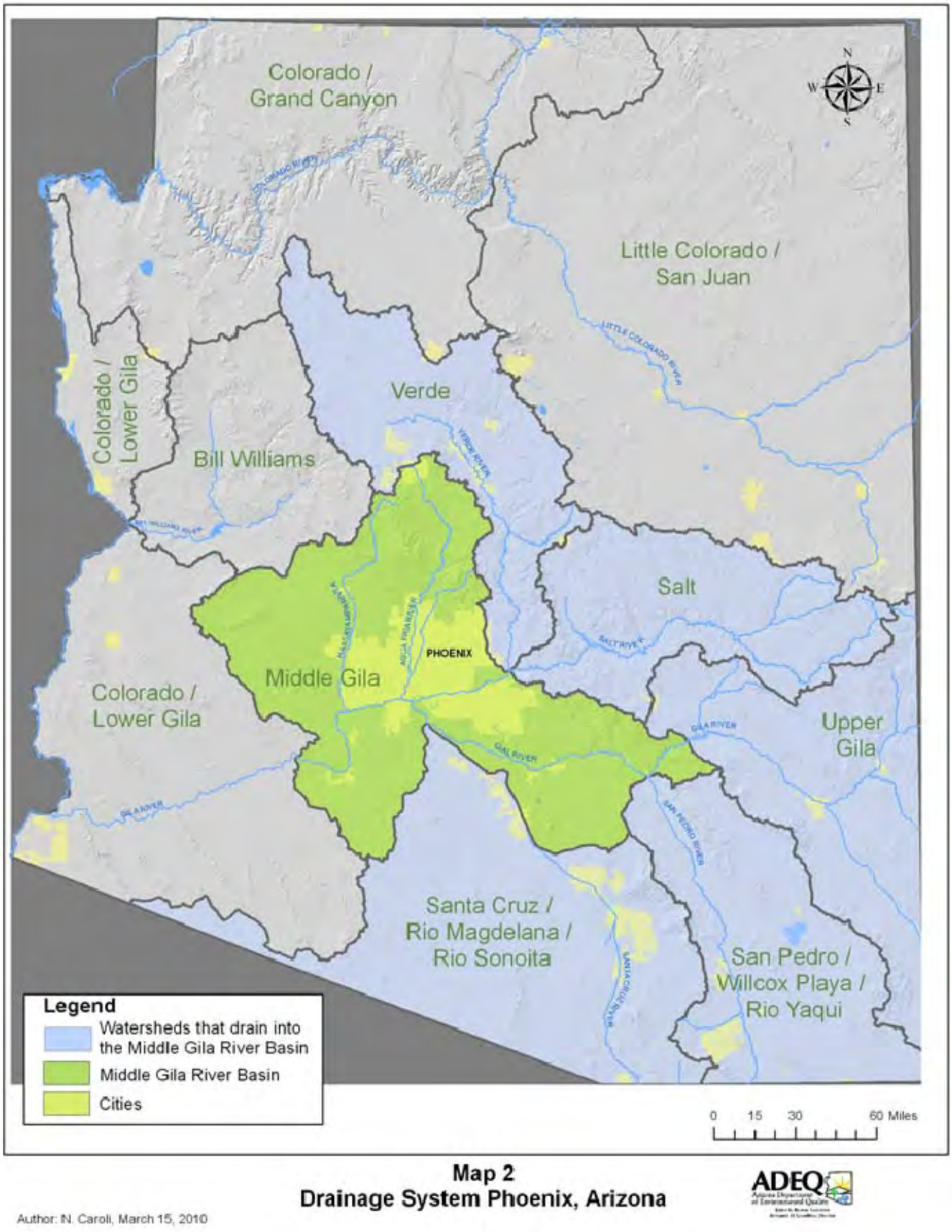


Figure 2-2. Drainage System of Phoenix, Arizona.

Climate

Phoenix has an arid climate, with very hot summers and temperate winters. The average summer high temperature is among the hottest of any populated area in the United States. The temperature reaches or exceeds 100ºF an average of 110 days during the year and highs top 110ºF an average of 18 days during the year. Phoenix receives an average of 7.66 inches of rain per year.

Precipitation is sparse during the first part of the summer, but the influx of monsoonal moisture, which generally begins in early July and lasts until mid-September, raises humidity levels and can cause heavy localized precipitation and flooding. Although thunderstorms are possible at any time of the year, they are most common during the monsoon season from July to mid-September as humid air is advected from the Gulf of California, Gulf of Mexico, and large thunderstorm complexes from the Sierra Madre Occidental Mountains in Mexico. This influx in moisture, combined with intense solar heating, often creates a very unstable environment that is ripe for thunderstorm development. These thunderstorms can bring strong winds and blowing dust, large hail, and heavy rain. Dust storms associated with these thunderstorms typically occur in the early part of the monsoon season (July) before soaking rains help keep soil particles bound to one another. However, depending on the amount of precipitation received during the monsoon season, extremely hot temperatures act to dry out the surface quickly, and dust storms can occur at any time. During the December through March period, winter storms moving inland from the Pacific Ocean can bring strong winds, blowing dust and significant rains throughout Arizona. This December – March time period, and July – August time period are typically the wettest parts of the year. Meanwhile, a distinct dry season occurs during the period April through June for Phoenix and the rest of Arizona. While these weather patterns describe the general climatology for the Phoenix area over a long period of time, Phoenix and the entire state of Arizona is also prone to a high degree of variability in these weather patterns from year to year.

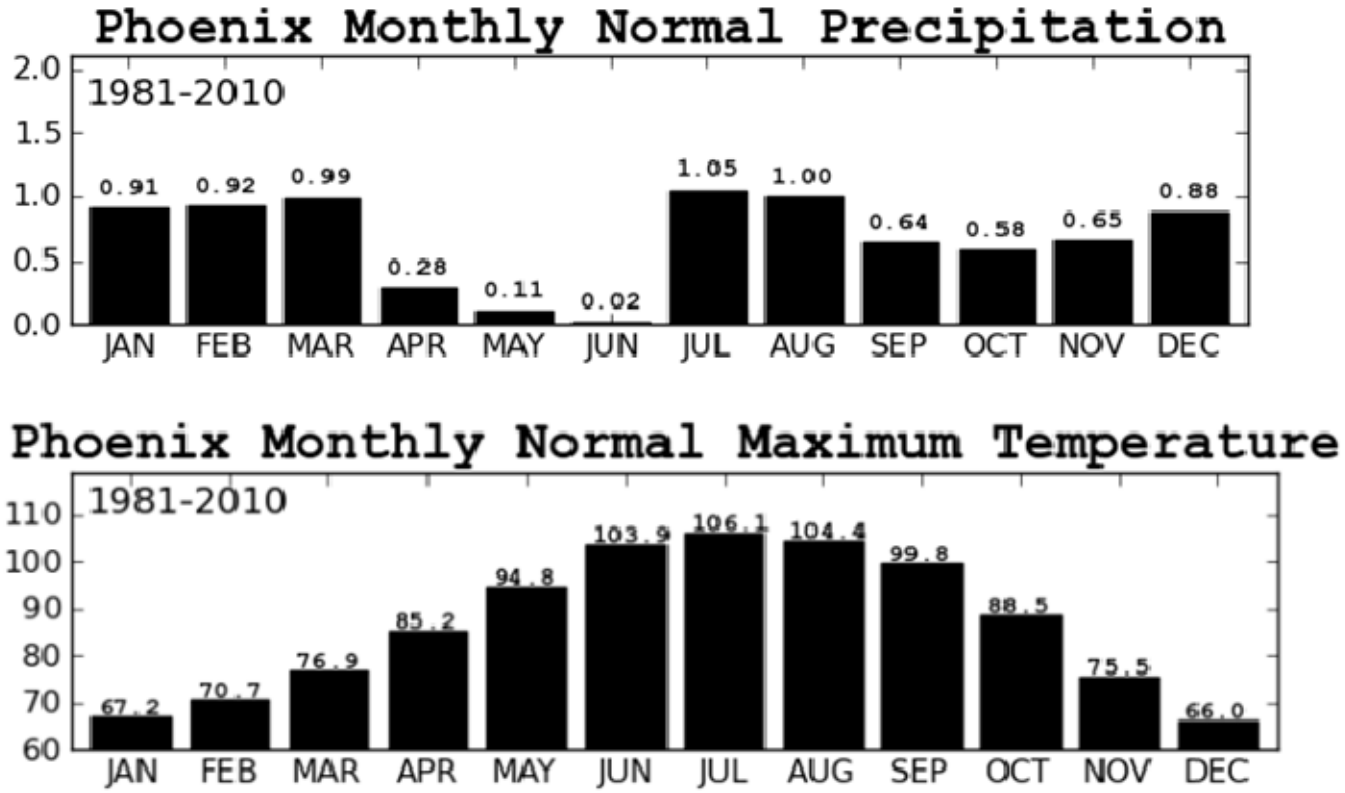


Figure 2-3 Phoenix Monthly Precipitation (top) and Maximum Temperature (bottom) Climatology (source: National Weather Service).

Monsoon Season Thunderstorm Outflow Dust Storm Event Summary

The North American Monsoon is a shift in wind patterns in the summer which occurs as Mexico and the southwest U.S. warm under intense solar heating. As this happens, low level moisture is transported primarily from the Gulf of California and eastern Pacific Ocean into the southwestern U.S. Mid and upper level moisture is also transported into the region, mainly from the Gulf of Mexico by easterly winds aloft. This combination causes a distinct rainy season over large portions of western North America, which develops rather quickly and sometimes dramatically. There are usually distinct "burst" periods of heavy rain during the monsoon, and "break" periods with little or no rain. Even during active monsoon periods, some areas can go without receiving any significant precipitation while other nearby areas experience heavy rains and flooding.

In addition to bringing precipitation, active thunderstorms can produce downbursts, or sometimes more concentrated and severe microbursts, which are rapidly descending bursts of air spreading away from the thunderstorm clouds. These downward bursts of air hit the ground and then disperse away from the storms as areas of outflow. These outflow boundaries from the thunderstorms can generate large walls of dust, sometimes called haboobs, and transport that dust for long distances from the initiating thunderstorms (see Figure 2–4).

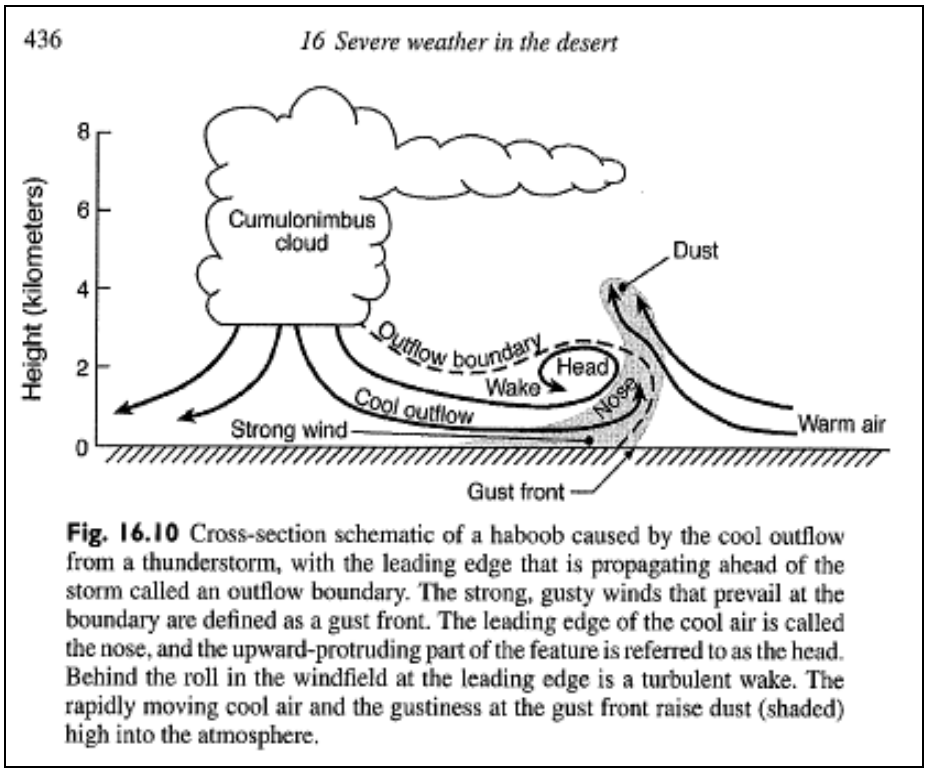


Fig. 16.10 Cross-section schematic of a haboob caused by the cool outflow from a thunderstorm, with the leading edge that is propagating ahead of the storm called an outflow boundary. The strong, gusty winds that prevail at the boundary are defined as a gust front. The leading edge of the cool air is called the nose, and the upward-protruding part of the feature is referred to as the head. Behind the roll in the windfield at the leading edge is a turbulent wake. The rapidly moving cool air and the gustiness at the gust front raise dust (shaded) high into the atmosphere.

Figure 2-4. Cross-section of a thunderstorm creating an outflow boundary and haboob (Source: Desert Meteorology. Thomas T. Warner. 2004.)

The active monsoon period during the evening of August 2nd into the early morning hours of August 3rd led to numerous thunderstorms in southern Arizona. These strong thunderstorms, located in the natural desert areas of northern Pima and southern Pinal counties, contained no precipitation and produced intense outflow winds that generated and transported significant quantities of blowing dust north-northwest towards the Maricopa County nonattainment area. The thunderstorm generated windblown dust was first transported to Pinal County monitors in the early morning hours of August 3, 2011, causing four monitors to exceed. The outflow generated dust continued on prevailing winds towards the nonattainment area, first impacting the Higley and West Chandler monitors in Maricopa County between 1:00 AM – 2:30 AM., and then impacting the rest of the Phoenix Metro area at around 2:30 AM – 5:30 AM. Confirmation of this dust storm was noted by the National Weather Service which issued a dust storm warning for the greater Phoenix area and north central Pinal County at 12:55 AM. The dust storm warning was in effect until 2:00 AM and describes reported visibilities of a quarter mile and blowing dust moving north towards Phoenix.

The vast majority of the PM10 impacting the nonattainment area from the thunderstorm driven high wind event of August 3, 2011, originated outside of the nonattainment area in the desert areas of Pinal County. The outflow winds and associated transported windblown dust decreased in energy and deposited out as it encountered increased resistance from the surface roughness elements of the urbanized nonattainment area As such, the nonattainment area monitor closest to the source region of the transported dust (West Chandler) recorded the highest PM10 concentrations and an exceedance of the PM10 standard. The nonattainment monitors farthest away from the source region, or not directly in the path of the outflow, showed smaller, but still significantly large PM10 concentrations from the event.

A contributing factor that led to this dust storm was the on-going drought across the region. The U.S. Drought Monitor as of August 2, 2011, placed the area between Tucson and Phoenix in D1 (Moderate) to D2 (Severe) drought. This distribution of the drought regions sheds light on why the deserts of Pinal and Pima counties have a high probability of creating windblown dust from precipitation-free thunderstorm outflows in the summer of 2011.

A more detailed explanation and time series visualization of the thunderstorm outflow dust storm event is available in Section V, describing the clear causal connection between the approaching outflow and the elevated and exceeding PM10 concentrations recorded in the nonattainment area.

As a summary of the event, Figure 2–6 displays an hourly graph of the PM10 concentrations throughout Maricopa County and the nonattainment area. Table 2–1 contains PM10 concentration data from all recorded monitors throughout the State of Arizona.

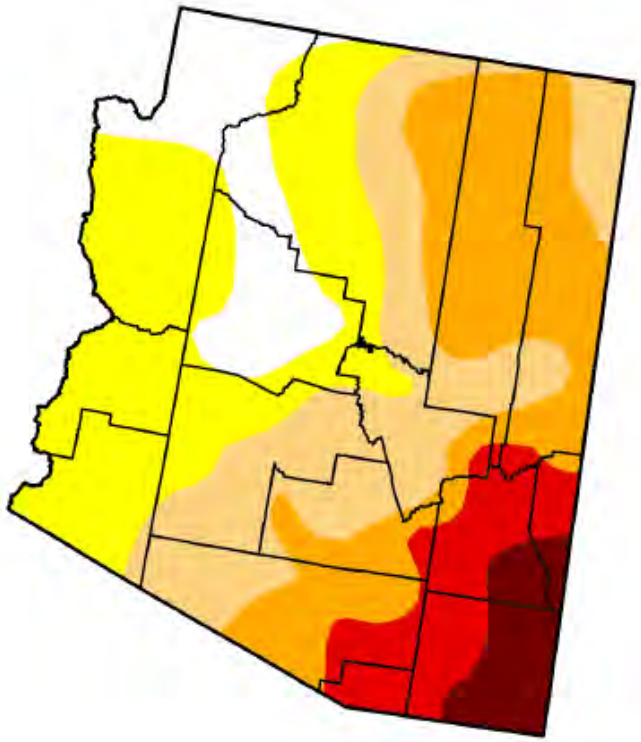
U.S. Drought Monitor

August 2, 2011
Valid 7 a.m. EST

Arizona

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	11.15	88.85	60.35	37.15	14.02	4.83
Last Week (07/26/2011 map)	11.15	88.85	60.35	37.15	14.02	4.83
3 Months Ago (05/03/2011 map)	13.93	86.07	57.89	31.54	15.59	0.00
Start of Calendar Year (12/28/2010 map)	31.40	68.60	32.45	0.00	0.00	0.00
Start of Water Year (09/28/2010 map)	40.00	60.00	18.58	3.23	0.00	0.00
One Year Ago (07/27/2010 map)	28.79	71.21	28.56	5.05	0.00	0.00



Intensity:

- *D0 Abnormally Dry*
- *D1 Drought - Moderate*
- *D2 Drought - Severe*
- *D3 Drought - Extreme*
- *D4 Drought - Exceptional*

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

Released Thursday, August 4, 2011
Brad Rippey, U.S. Department of Agriculture

Figure 2-5. U.S. Drought Monitor analysis of Arizona released around the time period of the exceedance described in this report.

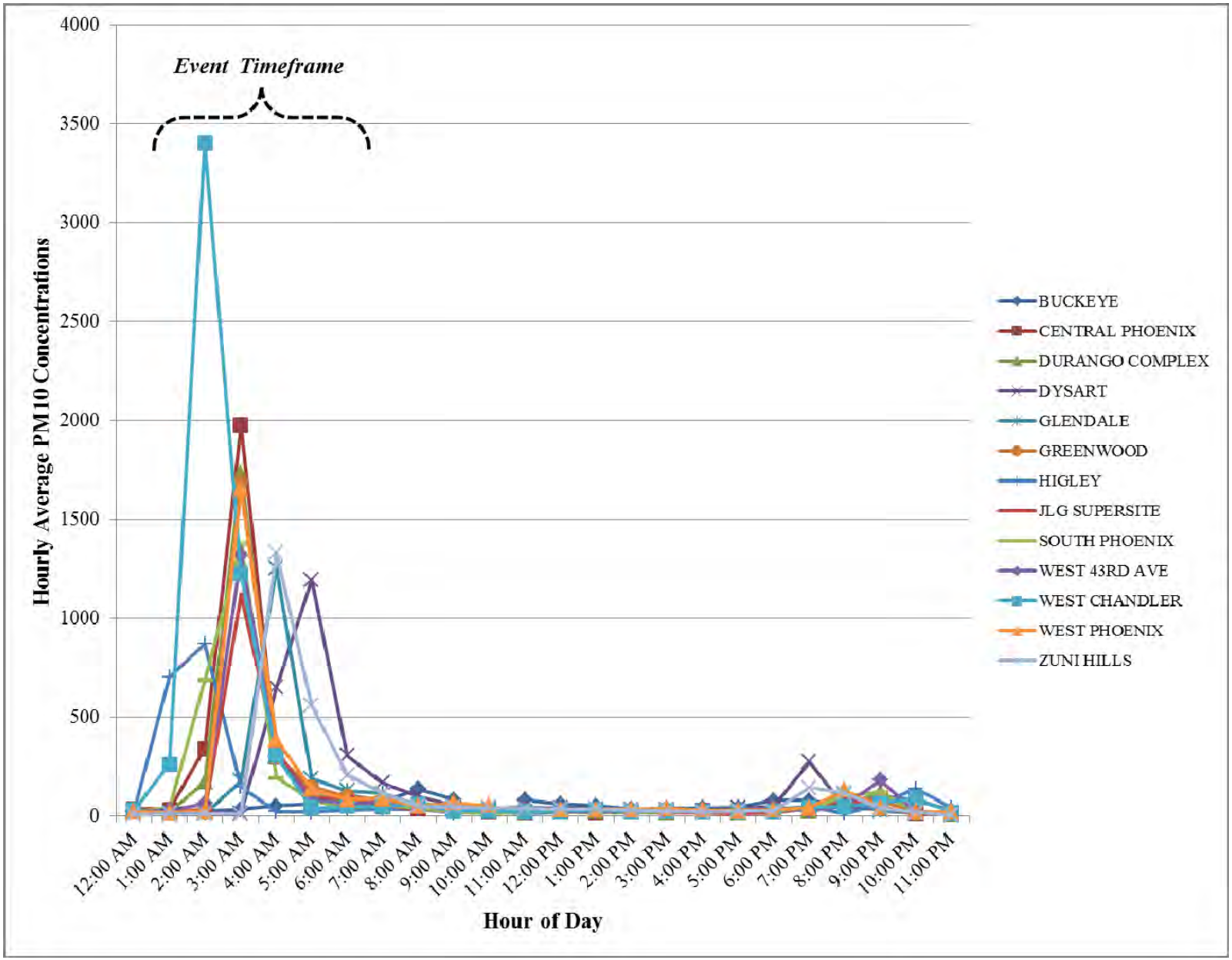


Figure 2-6. Timeline of PM10 concentrations at monitors in Maricopa County and the PM10 nonattainment area on August 3, 2011.

Table 2-1. Summary of Statewide PM10 Measurements for August 3, 2011.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM10 ($\mu g/m^3$)	1-hr Max PM10 ($\mu g/m^3$)	Max Time	AQS Qualifier Flag
Apache County							
N/A	N/A	WMAT	04-001-1003-81102-1	7.0	24	6	
Cochise County							
Douglas Red Cross	N/A	ADEQ	04-003-1005-81102-1	No Data	N/A	N/A	
Paul Spur Chemical Lime Plant	N/A	ADEQ	04-003-0011-81102-1	No Data	N/A	N/A	
Paul Spur Chemical Lime Plant	N/A	ADEQ	04-003-0011-81102-2	No Data	N/A	N/A	
Coconino County							
Flagstaff Middle School	N/A	ADEQ	04-005-1008-81102-1	No Data	N/A	N/A	
N/A	N/A	NN	04-005-1237-81102-1	25.0	71	22	
Gila County							
Hayden Old Jail	TEOM	ADEQ	04-007-1001-81102-3	19.5	73	17	
Payson Well Site	N/A	ADEQ	04-007-0008-81102-1	No Data	N/A	N/A	
Payson Well Site	N/A	ADEQ	04-007-0008-81102-2	No Data	N/A	N/A	
Maricopa County							
Buckeye	TEOM	MC	04-013-4011-81102-1	62.0	138	8	
Central Phoenix	TEOM	MC	04-013-3002-81102-4	144.3	1977	3	
Durango Complex	TEOM	MC	04-013-9812-81102-1	129.8	1736	3	
Dysart	TEOM	MC	04-013-4010-81102-1	136.4	1195	5	
Fort McDowell/ Yuma Frank	TEOM	FMIR	04-013-5100-8112-1	60.0	N/A	N/A	
Glendale	TEOM	MC	04-013-2001-81102-1	106.7	1255	4	
Greenwood	TEOM	MC	04-013-3010-81102-1	125.5	1692	3	
High School Air Monitoring Station	N/A	SRP-MIC	04-013-7024-81102-1	No Data			
Higley	TEOM	MC	04-013-4006-81102-1	102.0	872	2	
JLG Supersite	BAM	ADEQ	04-013-9997-81102-3	87.6	985	3	
JLG Supersite	TEOM	ADEQ	04-013-9997-81102-4	92.2	1120	3	
Lehi Air Monitoring Station	N/A	SRP-MIC	04-013-7022-81102-1	No Data	N/A	N/A	
Mesa	FRM	MC	04-013-1003-81102-1	No Data	N/A	N/A	
North Phoenix	FRM	MC	04-013-1004-81102-1	No Data	N/A	N/A	
Senior Center Air Monitoring Station	N/A	SRP-MIC	04-013-7020-81102-1	No Data	N/A	N/A	
Senior Center Air Monitoring Station	N/A	SRP-MIC	04-013-7020-81102-2	No Data	N/A	N/A	
South Phoenix	TEOM	MC	04-013-4003-81102-1	128.4	1376	3	
South Scottsdale	FRM	MC	04-013-3003-81102-1	No Data	N/A	N/A	
West Chandler	TEOM	MC	04-013-4004-81102-1	248.8	3404	2	RJ
West Forty Third	TEOM	MC	04-013-4009-81102-1	109.0	1321	3	
West Phoenix	TEOM	MC	04-013-0019-81102-1	134.7	1655	3	
Zuni Hills	TEOM	MC	04-013-4016-81102-1	124.0	1332	4	
Mohave County							
Bullhead City ADEQ	N/A	ADEQ	04-015-1003-81102-1	No Data	N/A	N/A	
Navajo County							
N/A	N/A	WMAT	04-017-1002-81102-1	9.9	21	8	
Pima County							
Ajo	TEOM	ADEQ	04-019-0001-81102-3	58.3	135	3	
Corona de Tucson	FRM	PCDEQ	04-019-0008-81102-1	No Data	N/A	N/A	
Geronimo	BAM	PCDEQ	04-019-1113-81102-1	14.3	29	23	
Green Valley	BAM	PCDEQ	04-019-1030-81102-1	11.2	33	1	
Orange Grove	FRM	PCDEQ	04-019-0011-81102-2	12.0	N/A	N/A	
Prince Road	FRM	PCDEQ	04-019-1009-81102-1	No Data	N/A	N/A	
Rillito	TEOM	ADEQ	04-019-0020-81102-3	36.9	131	5	
Santa Clara	FRM	PCDEQ	04-019-1026-81102-1	No Data	N/A	N/A	
South Tucson	FRM	PCDEQ	04-019-1001-81102-1	10.0	N/A	N/A	

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM10 (µg/m^3)	1-hr Max PM10 (µg/m^3)	Max Time	AQS Qualifier Flag
Tangerine	FRM	PCDEQ	04-019-1018-81102-1	No Data	N/A	N/A	
Pinal County							
Apache Junction Fire Stn.	FRM	PCAQCD	04-021-3002-81102-1	No Data	N/A	N/A	
Casa Grande Downtown	TEOM	PCAQCD	04-021-0001-81102-3	101.0	862	2	
Coolidge	FRM	PCAQCD	04-021-3004-81102-1	No Data	N/A	N/A	
Combs School	TEOM	PCAQCD	04-021-3009-81102-3	112.0	1056	2	
Cowtown	FRM	PCAQCD	04-021-3013-81102-1	No Data	N/A	N/A	
Cowtown	TEOM	PCAQCD	04-021-3013-81102-3	421.0	4021	2	RJ
Eloy	FRM	PCAQCD	04-021-3014-81102-1	No Data	N/A	N/A	
Maricopa	TEOM	PCAQCD	04-021-3010-81102-3	187.0	N/A	N/A	RJ
Pinal Air Park	N/A	PCAQCD	04-021-3007-81102-1	No Data	N/A	N/A	
Pinal County Housing	FRM	PCAQCD	04-021-3011-81102-1	No Data	N/A	N/A	
Pinal County Housing	FRM	PCAQCD	04-021-3011-81102-2	No Data	N/A	N/A	
Pinal County Housing	TEOM	PCAQCD	04-021-3011-81102-3	296.0	3780	1	RJ
Stanfield	TEOM	PCAQCD	04-021-3008-81102-3	467.0	9622	2	RJ
N/A	N/A	PCAQCD	04-021-7004-81102-1	No Data	N/A	N/A	
N/A	N/A	PCAQCD	04-021-7004-81102-2	No Data	N/A	N/A	
Santa Cruz County							
Nogales Post Office	BAM	ADEQ	04-023-0004-81102-1	No Data	N/A	N/A	
Nogales Post Office	BAM	ADEQ	04-023-0004-81102-3	14.9	42	22	
Yavapai County							
Prescott Valley	FRM	ADEQ	04-025-2002-81102-1	No Data	N/A	N/A	
Yuma County							
Yuma Supersite	TEOM	ADEQ	04-027-8011-81102-3	28.9	67	19	

III. HISTORICAL FLUCTUATIONS

Figure 3–1 displays a time series plot of the 24-hour PM10 concentrations for the period January 1, 2007 through December 31, 2011 for the exceeding West Chandler monitor. Additionally, the West Chandler monitor has continuous data available as of September 26, 2009, which allows for a time series plot of the daily maximum hourly average PM10 concentrations as shown in Figure 3–2. Both figures indicate that the PM10 concentrations seen at the West Chandler monitor on August 3, 2011 were in excess of normal historical fluctuations.

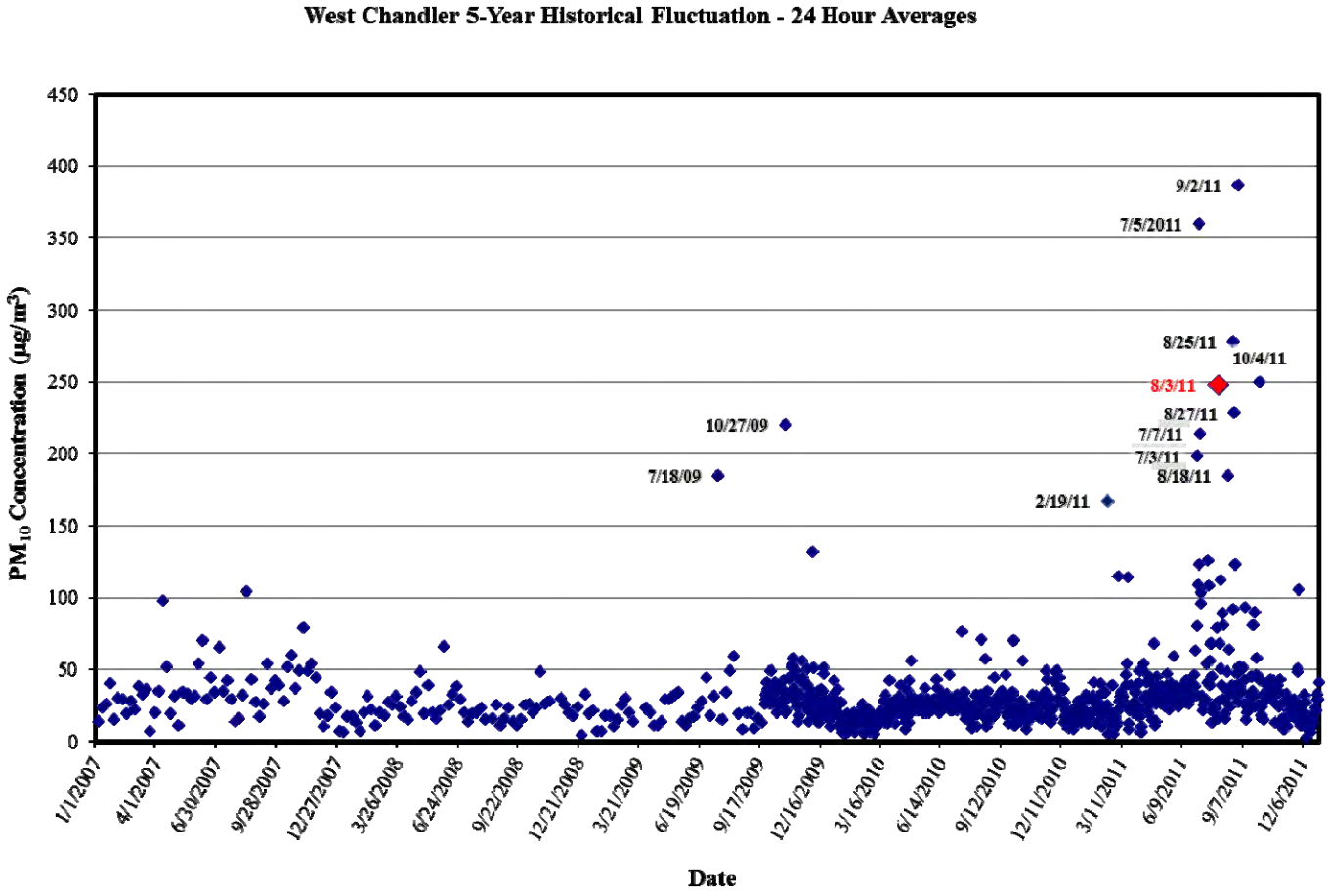


Figure 3-1. Plot of 24-hour average PM10 concentrations (2007 – 2011) at the West Chandler monitor.

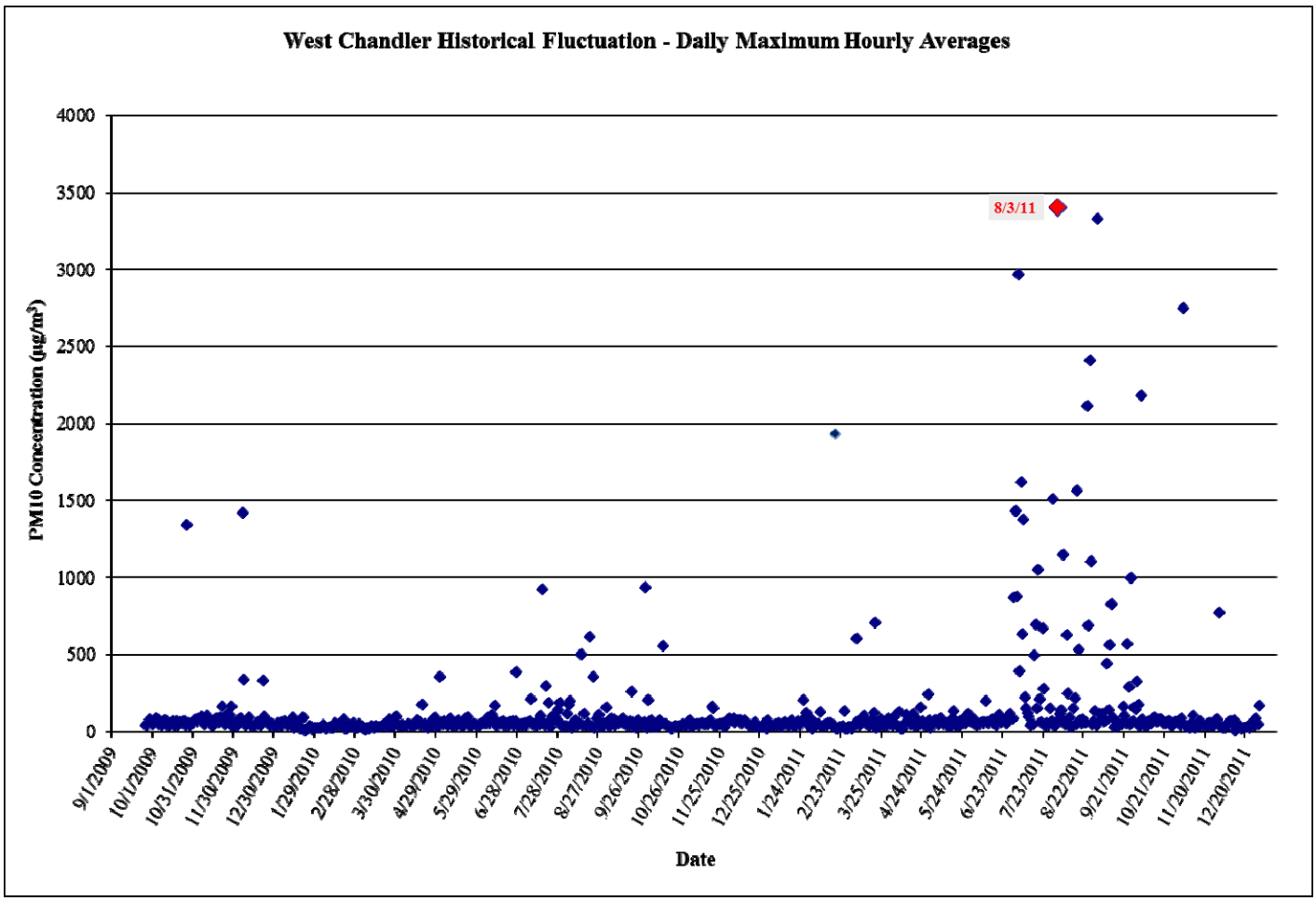


Figure 3-2. Plot of daily hourly maximum PM10 concentrations (September 2009 – 2011) at the West Chandler monitor.

IV. NOT REASONABLY CONTROLLABLE OR PREVENTABLE

Section 50.1(j) of Title 40 CFR Part 50 requires that an event must be "not reasonably controllable or preventable" in order to be defined as an exceptional event. This requirement is met by demonstrating that despite reasonable control measures in place within Maricopa County and the Phoenix PM10 nonattainment area, high wind conditions overwhelmed all reasonably available controls. The event occurring on August 3, 2011 was directly related to strong and gusty winds generated by thunderstorm outflows. The gusty outflow winds overwhelmed all reasonably available controls, and were also responsible for the transport of PM into the Maricopa County PM10 nonattainment area from areas outside of the nonattainment area. As shown in Section V, the source region for the thunderstorm outflows and associated transported dust on August 3, 2011, came from the desert areas of Pinal and Pima counties. While it is likely that some dust was generated within the nonattainment area as gusts from the thunderstorm outflows passed through the area, the transport of dust from the source regions outside the nonattainment area was overwhelming responsible for the elevated and exceeding concentrations of PM10 within the nonattainment area. Strict controls on local sources of fugitive dust were in place and enforced during all of the event on August 3, 2011, but were not capable of controlling transported dust and PM10 raised by the gusty and turbulent thunderstorm outflows on this date.

The following sections describe the BACM- and MSM-level PM10 control measures in place on August 3, 2011, and the robustness of the programs designed to enforce these measures. Inspections of local sources performed before, during and after August 3, 2011, confirmed that no unusual anthropogenic PM10-producing activities occurred in Maricopa County, the Phoenix PM10 nonattainment area, nor the local areas surrounding the exceeding monitor.

Regulatory Measures and Control Programs

The Arizona Department of Environmental Quality (ADEQ) and the Maricopa County Air Quality Department (MCAQD) are responsible for implementing regulatory measures to control emissions from agricultural sources, stationary sources, fugitive dust sources, and open burning within Maricopa County. Three major programs provide or contribute to air pollution control measures for the Greater Phoenix area. These programs include:

1.) ADEQ's Agricultural Best Management Program (AgBMP)
2.) Maricopa County's Inspection and Compliance Program
3.) ADEQ's Air Quality Forecasting Program

Specifically, ADEQ is responsible for compliance assistance and enforcement of Agricultural Best Management Practices developed by the Governor's Agricultural Best Management Practices Committee, while MCAQD is responsible for compliance assurance for all other significant sources of PM10 emissions. In addition to routine inspections and inspections driven by complaints, inspections are often increased when 1.) ADEQ forecasters issue a High Risk for the Maricopa County Dust Control Forecast, 2.) ADEQ forecasters issue a High Pollution Advisory, or 3.) near real-time monitoring data indicate unique activity via high PM concentrations. The forecasting program and inspection / compliance programs work together so that resources can be best utilized during days that are of greatest risk for elevated PM emissions.

On July 25, 2002, EPA took initial action to finalize approval of the Best Available Control Measure (BACM) and the Most Stringent Measure (MSM) demonstrations in the Serious Area PM10 plan for the Maricopa County portion of the metropolitan Phoenix PM10 nonattainment area (67 FR 48718). These BACM and MSM demonstrations were again approved by EPA on July 14, 2006 (71 FR 43979). The Agricultural Best Management Practices General Permit rule and related definitions have been approved into the Arizona Administrative Code as R18-2-610 and R18-2-611 pursuant to Arizona Revised Statutes § 49-457[1] . Maricopa County regulations of PM10 emissions are listed in Table 4-1.

Table 4-1. Rules and Ordinances Regulating Particulate Matter Emissions in Maricopa County.

Rule/Ordinance Number & Title	Description
Rule 300: Visible Emissions	Establishes standards for visible emissions and opacity.
Rule 310: Fugitive Dust from Dust-Generating Operations	Establishes limits for the emissions of particulate matter into the ambient air from any property, operations, or activity that may serve as a fugitive dust source.
Rule 310.01: Fugitive Dust from Non-Traditional Sources of Fugitive Dust	Establishes limits for the emissions of particulate matter into the ambient air from open areas, vacant lots, unpaved parking lots, and unpaved roadways which are not regulated by Rule 310 and which are not required to have either a permit or a dust control plan.
Rule 311: Particulate Matter from Process Industries	Establishes emission rates based on process weight applicable to any affected operations not subject to Rule 316.
Rule 312: Abrasive Blasting	Establishes limits for particulate emissions from abrasive blasting operations.
Rule 314: Open Outdoor Fires and Indoor Fireplaces at Commercial and Institutional Establishments	Establishes limits for the emissions of air contaminants produced from open burning.
Rule 316: Nonmetallic Mineral Processing	Establishes limits for the emissions of particulate matter into the ambient air from any nonmetallic mining operation or rock product processing plant.
Rule 317: Hospital/Medical/ Infectious Waste Incinerators	Establishes limits for the emissions of air pollutants from medical waste incinerators.
Rule 322: Power Plant Operations	Establishes limits for the emissions of nitrogen oxides, sulfur oxides, carbon monoxide and particulate matter from existing power plants and cogeneration plants.
Rule 323: Fuel Burning Equipment from Industrial/Commercial/ Institutional (ICI) Sources	Establishes limits for the emissions of nitrogen oxides, sulfur oxides, carbon monoxide and particulate matter from ICI sources.
Rule 324: Stationary Internal Combustion (IC) Engines	Establishes limits for the emissions of carbon monoxide, nitrogen oxides, sulfur oxides, volatile organic compounds, and particulate matter from stationary internal combustion engines, including stationary IC engines used in cogeneration.

[1] Updates to the AgBMP program in December , 2011, clarified BMPs for crop and added BMPs for animal operations. Effective 12/29/2011, R18-2-611 was renumbered to R18-2-610.0,1 **Agricultural PM10 Genral Permit for Crop Operations** and R18-2-611.01, **Animal Operations PM10 General Permit** was added. Definitions for Crop Operations were revised at R18-2-610 and new definitions for Animal Operations were added at R18-2-611.

Rule/Ordinance Number & Title	Description
Rule 325: Brick and Structural Clay Products (BSCP) Manufacturing	Establishes limits for particulate matter emissions from the use of tunnel kilns for curing in the brick and structural clay product (BSCP) manufacturing processes.
Ordinance P-25: Leaf Blower Restriction	Establishes restrictions for leaf blowers in incorporated and unincorporated sections of Area A in Maricopa County.
Ordinance P-26: Residential Woodburning Restriction	Establishes restrictions for residential woodburning.
Ordinance P-27: Vehicle Parking and Use on Unstabilized Vacant Lots	Establishes restrictions for vehicle parking and use on unstabilized vacant lots in unincorporated sections of Area A in Maricopa County.
Ordinance P-28: Off-Road Vehicle Use in Unincorporated Areas of Maricopa County	Establishes restrictions for operating vehicles on unpaved property in unincorporated areas of Maricopa County.
Arizona Administrative Code R18-2-611 & 610: Agricultural PM10 General permit	Establishes a requirement for commercial farmers to implement best management practices and maintain a record demonstrating compliance

In addition to the rules and regulations listed in the above table, other PM10 reducing control measures (e.g., paving of unpaved roads, PM10 certified street sweepers, controlling unpaved parking lots, etc.) have been committed to, and implemented by, local jurisdictions throughout the PM10 nonattainment area, and incorporated into the Arizona SIP through PM10 plans such as the Revised MAG 1999 Serious Area Particulate Plan for PM10 for the Maricopa County Nonattainment Area. The Pinal County Air Quality Control District (PCAQCD) also implements regulatory control measures on emissions from existing and new non-point sources within Pinal County (see Table 4-2). Additionally, the PCAQCD implements specific nonattainment rules for that part of the Phoenix PM10 nonattainment area that resides in Pinal County (see Table 4-3).

Table 4-2. Pinal County Rules Regulating Existing and New Non-point Sources in Pinal County.

Article Number & Title	Description
Article 2: Fugitive Dust	Provides a mechanism to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere
Article 3: Construction Sites – Fugitive Dust	Improves the control of excessive fugitive dust emissions that have been traditionally associated with construction, earthwork, and land development, and thereby minimize nuisance impacts

Table 4-3. Pinal County Rules Regulating Fugitive Dust in Pinal County Portion of MC PM10 NAA.

Article Number & Title	Description
Article 4: Nonattainment Area Rules; Dustproofing for Commercial Parking, Drives and Yards	Establishes rules to avoid violations of the prevailing PM10 standard and additionally minimize nuisance impacts by improving control of excessive fugitive dust emissions from unpaved parking lots
Article 5: Nonattainment Area Rules; Stabilization for Residential Parking and Drives	Establishes rules for stabilizing residential properties
Article 6: Restrictions on Vehicle Parking and Use on Vacant Lots	Establishes rules for unpaved or unstabilized vacant lots

Article Number & Title	Description
Article 7: Construction Sites in Nonattainment Areas – Fugitive Dust	Establishes rules to avoid violations of the prevailing PM10 standard and additionally minimize nuisance impacts by improving control of excessive fugitive dust emissions from activities associated with construction, earthwork, or land development.
Article 8: Nonattainment Area Rules, Requirement for Stabliazation of Disturbed Areas at Vacant Lots	Establishes rules for stabilizing disturbed areas at vacant lots

PM10 Rule Effectiveness

MCAQD analyzed the effectiveness of its fugitive dust rules (Rules 310, 310.01 and 316) in terms of permit compliance rates. This rule effectiveness (RE) study was designed to assess how many sources regulated by MCAQD during the subject time period received no PM10 emissions-related violations. As a basis for comparison, the percentage of permitted sources in compliance during calendar year 2007 was 76% for sources subject to Rule 310, 85% for Rule 310.01 sources, and 40% for Rule 316 sources. In early 2008, Rules 310, 310.01, and 316 were strengthened, and new ordinances (covering additional source categories such as leaf blowers, vacant lots, and off-road vehicles) were adopted. These enhancements resulted from MCAQD department's obligations under such agreements as the 2005 Revised PM10 State Implementation Plan for the Salt River Area and the Maricopa Association of Governments (MAG) 2007 Five Percent Plan for PM10 for the Maricopa County Nonattainment Area to reduce PM10 emissions throughout the county. Three major areas that contributed to increased compliance were an increase in departmental staffing (especially inspectors), a robust training program, and regulatory changes that broadened and strengthened control measures under Rules 310, 310.01, and 316.

Source compliance rates were re-assessed for FY 2009 (July 2008–June 2009), a period that allowed time for the new and revised regulations to take effect. The results showed significant increases in compliance compared with the earlier period: to 90% (from 76%) for Rule 310 sources, 95% compliance (from 85%) for Rule 310.01 sources, and 65% (from 40%) for Rule 316 sources. These improvements continued into calendar year 2010 with compliance rates of 94% for Rule 310 sources, 96% for Rule 310.01, and 73% for Rule 316 sources. The timeline below illustrates the improvements in RE over the last several years, and also points out significant revisions to previous rules, as well as newly adopted rules and ordinances.

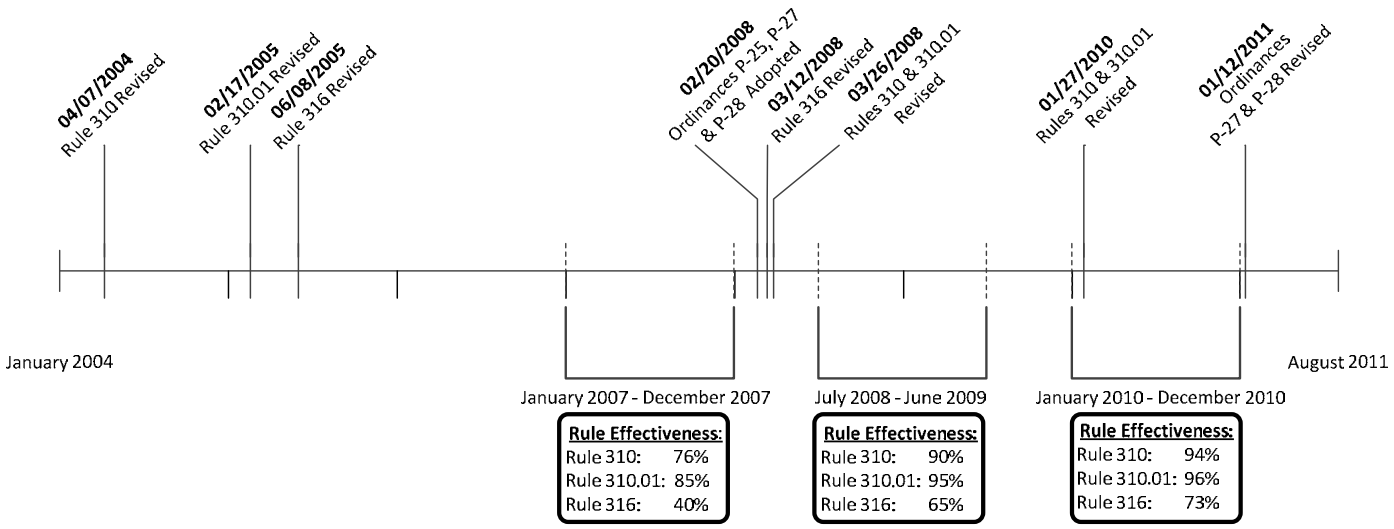


Figure 4-1. Timeline of Maricopa County fugitive dust rules and ordinances.

Compliance and Enforcement Activities

MCAQD is prepared to proactively respond to high wind events and to protect human health and well-being. MCAQD's approach consists of two primary components: routine proactive inspections, as well as surveillance inspections, conducted both during and after significant events. MCAQD proactively inspects dust control-permitted sites and increases the frequency for larger sites of 10 acres or more. Rule 316 sources are also proactively inspected multiple times every year. Maricopa County also responds to the majority of complaints within 24 hours.

Maricopa County monitors the ADEQ Five-Day Dust Control Forecast to identify the potential for elevated PM_{10} pollution levels due to high winds or stagnant conditions. When a High Pollution Advisory (HPA) is issued for Maricopa County, MCAQD conducts additional surveillance before, during, and after the forecast event(s). MCAQD also conducts event surveillance and post-event activities on exceedance days that had not been forecast (i.e., those instances in which an HPA had not been issued).

Pre-event surveillance consists of surveying high risk areas for any dust-generating activities, educating sources of the impending HPA event, and issuing violations for failure to comply with local, state, or federal regulations. During the event, MCAQD inspectors survey high-risk areas to confirm that control measures are in place, document any violations, and contact other regulatory agencies if necessary. Post-event activities include continued surveys of high-risk areas, re-inspection of sources that had received violations within two business days, and an internal MCAQD debriefing of event activities.

Recently, a total of twelve MCAQD air monitoring sites have been updated with new equipment that allows the monitoring sites to automatically report monitored readings at 5-minute intervals, where previously only hourly data were available. The real-time monitoring data programming includes threshold triggers that cause the system to send alerts to MCAQD staff that the PM concentrations are elevated. The system allows MCAQD responders to review concentrations at the monitor and to consult the National Weather Service website to check for weather event activity. This capability allows the

responder to identify regional events and monitor specific issues. If necessary, the MCAQD responders can inform nearby stakeholders and local governments of the elevated PM_{10} concentrations.

For August 3, 2011, a Maricopa County Dust Control Forecast was issued indicating a low risk level for unhealthy PM10 with westerly 10-20 mph winds during the afternoon. For the event on August 3, MCAQD responders evaluated the situation when concentrations were elevated. During the alerts MCAQD observed weather system activity and noted that many monitors were sequentially impacted by high winds.

An evaluation of inspection reports and compliance records indicate no evidence of unusual anthropogenic-based PM_{10} emissions. During the time period of July 31 through August 6, 2011, MCAQD inspectors conducted a total of 227 inspections on permitted facilities, of which 157 were at fugitive dust sources. Additionally, MCAQD conducted 35 inspections on vacant lots and unpaved parking lots.

During this 7-day period, a total of 20 violations were issued county-wide for PM_{10} and non-PM_{10}-related violations. No violations were issued for PM_{10} emissions within a 4-mile radius of the exceeding monitor.

MCAQD was prepared for any complaints received due to the high wind event. During the 7 day period from July 31st through August 6th, 2011, MCAQD received 24 complaints, of which 11 were windblown dust-related. Each complaint was assigned and investigated by a MCAQD inspector. A review of all records during this period reveals that MCAQD inspectors observed no violations of local, state, or federal regulations within a 4-mile radius of the exceeding monitor.

In addition to MCAQD's efforts in pre-event surveillance and proactive inspections, ADEQ's Agricultural Best Management Practice Program (Ag BMP) inspector also monitors the ADEQ Five-Day Dust Control Forecast and the MCAQD air monitoring sites that include real-time data. The ADEQ Ag BMP inspector uses specific knowledge of seasonal activities and associations with the local growers and dairymen to communicate the importance of limiting dust-generating activities, especially during high-wind events. Additional outreach is conducted with facility representatives prior to forecasted high-wind alert days. Should the PM10 readings at a MCAQD air monitoring site show notable increases, the ADEQ Ag BMP inspector is dispatched to contact the owners and operators of agriculture fields in the area to discern if their activities are causing negative impacts. The Ag BMP inspector is prepared to respond to most agriculture complaints within 24 hours.

Based on a review of the inspection reports and site visit documentation, there is no evidence to suggest that agricultural activities produced unusual PM10 emissions. From August 1 through August 5, 2011, the ADEQ Ag BMP inspector received two complaints, performed a site visit at a nursery operation, and referred one complaint to a tribal program. The site visited was related to smoldering compost material and was addressed by fire department crews. This activity was not near the West Chandler monitor and would not have contributed to PM10 measurements at the site.

Conclusions

The thunderstorm outflow event on August 3, 2011 produced strong gusts and turbulent wakes that transported dust and PM10 into the Maricopa County PM10 nonattainment area. The source region of the outflows that caused the exceedances was largely located in areas outside the nonattainment area, primarily the deserts of Pinal County. The Maricopa County area is designated as a serious nonattainment area for PM10 and is required to have BACM for all significant sources of PM10. BACM-approved control measures on significant anthropogenic sources were in place and enforced during the events, and

pro-active tracking and response to the events by regulatory agencies and local governments confirmed the uncontrollable nature of the dust emissions; therefore, these pre-existing/prior approved required controls are adequate for meeting the requirements of an exceptional event and should be considered "reasonable" for these purposes.

Despite the deployment of comprehensive control measures and sophisticated response programs, high wind conditions associated with thunderstorms and thunderstorm outflows brought high concentrations of PM10 emissions into, and also overwhelmed controls within, the nonattainment area. Strong thunderstorm outflows with gusts over 30 mph, were enough to overwhelm all available efforts to limit PM10 concentrations from the events. The fact that this was a natural event involving strong thunderstorm outflow winds that transported PM10 emissions into Maricopa County from source regions outside of the nonattainment area provides strong evidence that the event and exceedance of August 3, 2011 recorded at the West Chandler monitor was not reasonably controllable or preventable.

V. CLEAR CAUSAL RELATIONSHIP

Introduction

A demonstration of the clear causal connection between windblown dust generated and transported by thunderstorm storm outflow winds and the exceedance at the West Chandler monitor on August 3, 2011 is provided in this section. Around midnight on August 2nd, a strong and somewhat localized thunderstorm outflow with gusts over 30 mph developed in the deserts of Pinal County and began transporting dust northward towards the nonattainment area. A 12:55 AM, the National Weather Service issued a dust storm alert for the greater Phoenix area and Northern Pinal County that indicated an embedded area of blowing dust with visibility reduced to a quarter mile in some areas. The thunderstorm outflow progressed predictably and visibly north-northwest into the Maricopa County nonattainment area, depositing PM10 along the away and slowly losing energy as the outflow encountered the urbanized portions of the nonattainment area. Moderate to light winds were enough to transport the windblown dust from the outflow across the entire nonattainment area over a period of about four hours. Although all monitors in the Maricopa County nonattainment area displayed elevated PM10 concentrations associated with the arrival of the thunderstorm outflow, the monitors located closest to the source region or directly in the path of the outflow registered the highest 24 hour PM10 concentrations, with the West Chandler monitor recording an exceedance of the PM10 standard. The West Chandler monitor was one of the first monitors to record the arrival of the thunderstorm outflow from Pinal County and as such was subject to greater quantities of transported PM10 than other nonattainment monitors located farther away from the source of the windblown dust. Drought conditions in Pinal County and southeastern Maricopa County likely exacerbated the amount of the dust the thunderstorm outflow was able to entrain.

A detailed description of the meteorology that caused the natural windblown dust exceedance event at the West Chandler monitor is described below in a series of time-stamped maps. Visibility photos from within the nonattainment area provide additional temporal evidence of the link between the blowing dust from thunderstorm outflow winds and high PM10 concentrations. The weight of evidence from these sources provides the clear causal connection between the windblown dust generated and transported by thunderstorm outflow winds and the exceedance at the West Chandler monitor on August 3, 2011.

Time Series Maps and Visibility Photos.

Figures 5–1 through 5–12 provide a time series GIS-based visualization of the meteorology and PM10 concentrations associated with the storm system. The data displayed in the following maps were gathered from five data sources. All available meteorological and air quality data was used in order to present the most complete story of the event. Table 5–1 displays the types of data used from each agency in creating the maps.

Table 5-1. **Data Sets Used in the Creation of Time Series GIS Maps.**

Agency	**Data Sets**
Arizona Department of Environmental Quality (ADEQ)	Hourly PM10 Concentrations, Wind Speed, Wind Direction and Wind Gusts
Arizona Meteorological Network (AZMET)	Hourly Wind Speed, Wind Direction and Wind Gusts
Maricopa County Air Quality Department (MCAQD)	5-Minute PM10 Concentrations, Wind Speed, Wind Direction, and Wind Gusts (hourly data used when 5-minute was unavailable)
Pinal County Air Quality Control District (PCAQCD)	Hourly PM10 Concentrations, 5-Minute and Hourly Wind Speed, Wind Direction and Wind Gusts
National Weather Service (NWS)	Point in Time Wind Speed, Wind Direction, Wind Gusts, Visibility and Base Velocity Radar

Map Description

A description of each time series map is provided to highlight important data in each map and explain the progression of the meteorology and PM10 concentrations through time. Taken as a whole, the maps and associated explanatory text describe the clear causal connection between the windblown dust generated and transported by the thunderstorm outflow winds and the PM10 exceedance at the West Chandler monitor.

12:00 AM – 12:30 AM

In this time period the first effects of the thunderstorm outflow are noted at the Pinal County Housing (PCH) monitor located in central Pinal County. An hourly average PM10 concentration value of 3,780 $\mu g/m^3$ is recorded at this monitor, along with sustained winds speeds of 20 mph and gusts of 32 mph. The thunderstorm outflow is partially visible on base velocity radar to the east of the PCH monitor. It is very likely the thunderstorm outflow generated dust storm developed in the area south of the PCH monitor, but north of Pima County, as the Rillito monitor located in northern Pima County is only recording an hourly average PM10 concentration of 35 $\mu g/m^3$ during this time period.

1:00 AM – 1:30 AM

The thunderstorm outflow reaches the southeastern portion of the nonattainment area. Pinal County monitors continue to show high PM10 concentrations from the dust storm. The strength of the leading edge of the outflow has weakened somewhat with sustained winds of 20 mph and gusts of 26 mph recorded at the Higley monitor. The front of the dust storm is just starting to raise PM10 concentrations in the nonattainment area. Visibility is still reported at 10 miles at the Williams Gateway Airport. The rest of the nonattainment area shows calm conditions, with no sustained winds over 10 mph. The National Weather Service will issue their dust storm warning for the greater Phoenix area at 12:55 AM, indicating the imminent arrival of the dust storm.

1:30 AM – 2:00 AM

Five-minute PM10 concentrations rise to more than 1,000 $\mu g/m^3$ at the Higley monitor and approach those levels at the West Chandler monitor. The outflow front is making its way north-northwest across the nonattainment area with sustained winds mainly in the middle teens. Visibility at the Williams Gateway Airport is now lowered to four miles. PM10 concentrations and winds remain high in Pinal County, the

source region of the event. The Cowtown monitor in Pinal County records the highest concentrations at this point, located almost directly south of the exceeding West Chandler monitor.

2:00 AM – 2:30 AM

The heart of the transported dust storm crosses over the West Chandler monitor during this and the following period, registering five-minute PM10 concentrations over 6,000 $\mu g/m^3$. The highest gust (29 mph) and sustained winds speeds (20 mph) in the nonattainment area are recorded by the West Chandler monitor as well. The Pinal County monitors directly south of the West Chandler monitor also still remain elevated, providing evidence that the densest parts of the dust storm were on a path to cross directly over the West Chandler monitor. Monitors to the east of the West Chandler monitor (Higley in the nonattainment area, Combs School in Pinal County) show lower PM10 concentrations, confirmed by the improved visibility of seven miles at Williams Gateway Airport up from the previously reported four miles.

2:30 AM – 3:00 AM

As indicated by the base velocity radar, the thunderstorm outflow is moving both to the north and the west, but the prevailing winds behind the outflow are largely still from the south. The dust storm has reached the central phoenix monitors, reducing visibility to 1.5 miles at Sky Harbor Airport. Concentrations are still extremely elevated at the West Chandler monitor and the Pinal County monitors to the south. As the outflow continues to lose strength as it passes over the urbanized areas, the dust will began to deposit out, but will still be transported by the prevailing winds across the entire nonattainment area.

3:00 AM – 3:30 AM

PM10 concentrations at West Chandler have started to decrease as the dust storm is transported further to the northwest. The central Phoenix monitors record the highest concentrations at this time, and the remnants of the thunderstorm outflow is barely visible on radar. Pinal County monitors have decreased significantly as well, indicating no new dust generation from that area. Gusts from the outflow generated winds are in the mid-20s and sustained winds are in the lower teens, still significant to transport PM10 to the northwest for several more hours. Visibility has improved somewhat at Sky Harbor Airport, but is lowest at 1.8 miles at the Scottsdale Airport.

3:30 AM – 4:00 AM

Transported dust from the thunderstorm outflow continues northwest across the nonattainment area on prevailing winds. The thunderstorm outflow that generated the dust storm is no longer visible on radar. Visibility is reduced to 1.5 miles at the Deer Valley Airport.

4:00 AM – 4:30 AM

The northernmost monitors of the nonattainment area are now impacted by the transported dust. Wind speeds continue to dissipate, with gust in the low 20's and sustained winds in the lower teens. Conditions are now calm at the monitors in the southeast portion of the nonattainment area. PM10 concentrations in that area are returning to normal as any remaining dust is either depositing out or being transported to the northwest under light winds.

4:30 AM – 5:00 AM

The dust storm continues its transport to the northwest under even lighter winds. Only a few met stations record sustained winds over 10 mph and visibility has largely returned to normal in all but the most western and northern portions of the nonattainment area.

5:30 AM – 6:00 AM

All sustained winds are now less than 10 mph and gusts are less than 20 mph. The PM10 from the dust storm is left to deposit out at the monitors and continue a slow transport to the northwest under light winds.

6:30 AM – 7:00 AM

Deposition from the dust storm continues, with all monitors now recording concentrations less than 500 $\mu g/m^3$. Visibility is relatively good throughout the entire nonattainment area.

8:30 AM – 9:00 AM

PM10 concentrations have returned to normal for all monitors in the region as deposition from the dust storm has largely been completed. Concentrations will remain low for the remainder of the day, until a minor wind event will raise concentrations briefly (but not significantly with a maximum hourly average of 277 $\mu g/m^3$) in the evening hours.

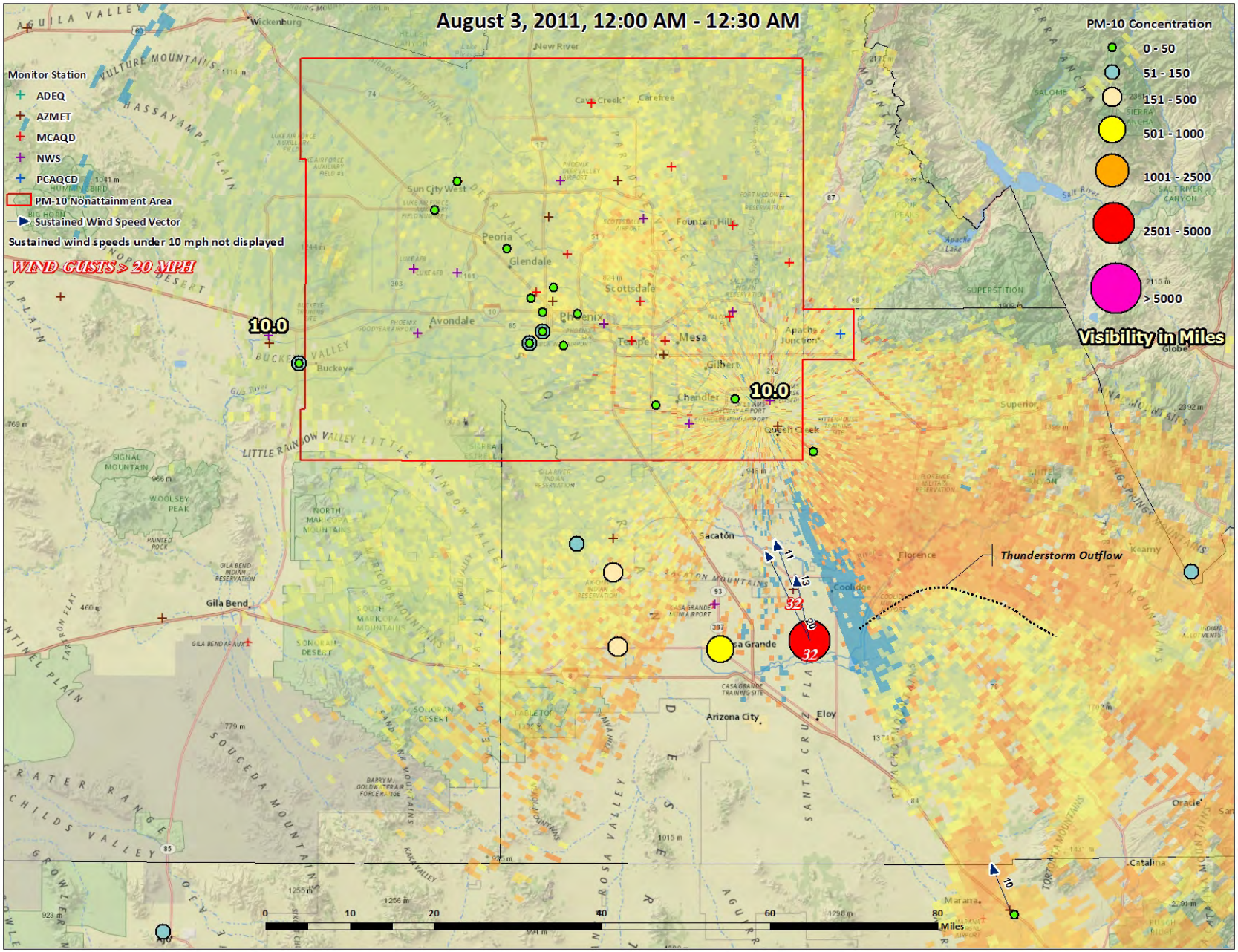


Figure 5-1. August 3, 2011, 12:00 AM – 12:30 AM.

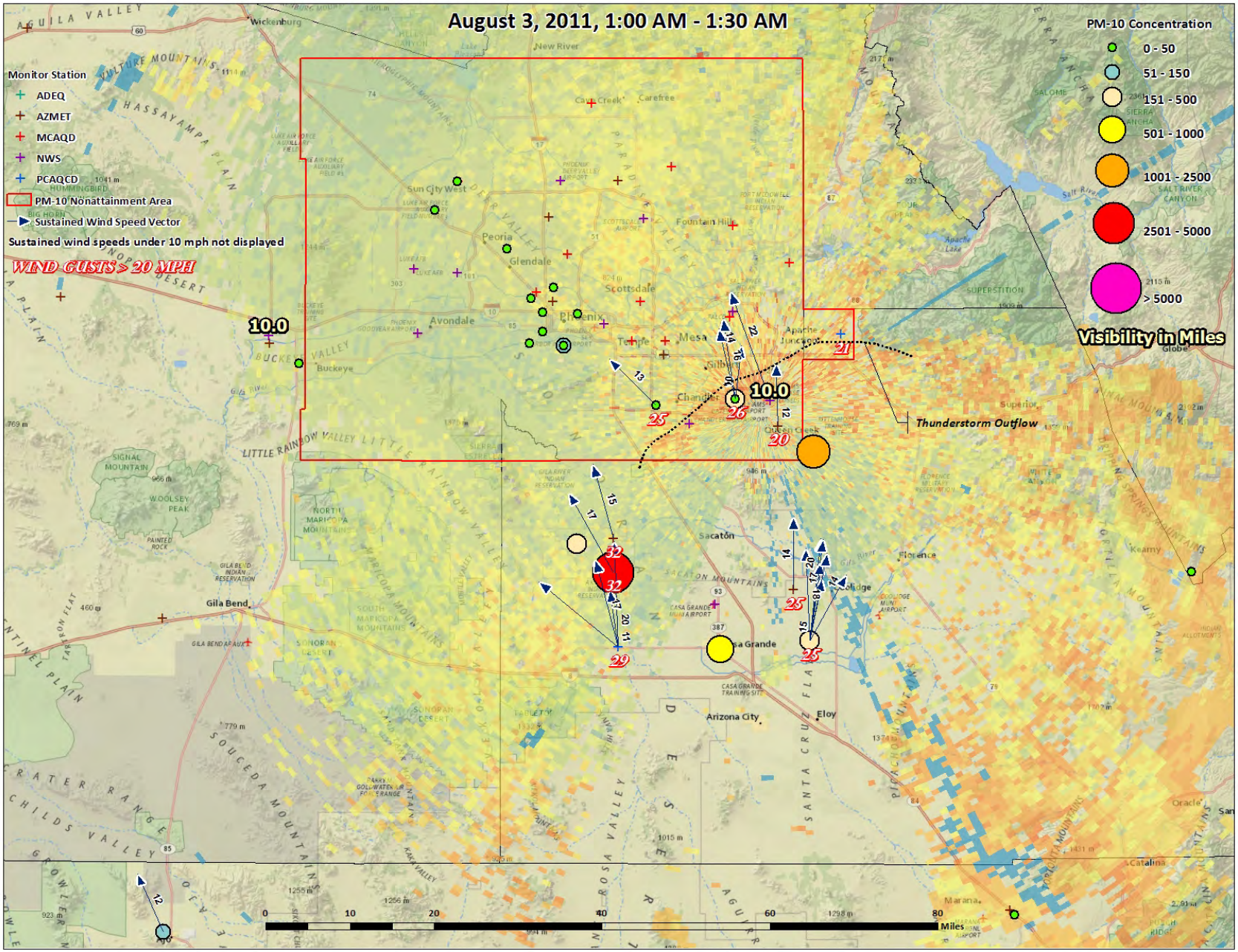


Figure 5-2. August 3, 2011, 1:00 AM – 1:30 AM.

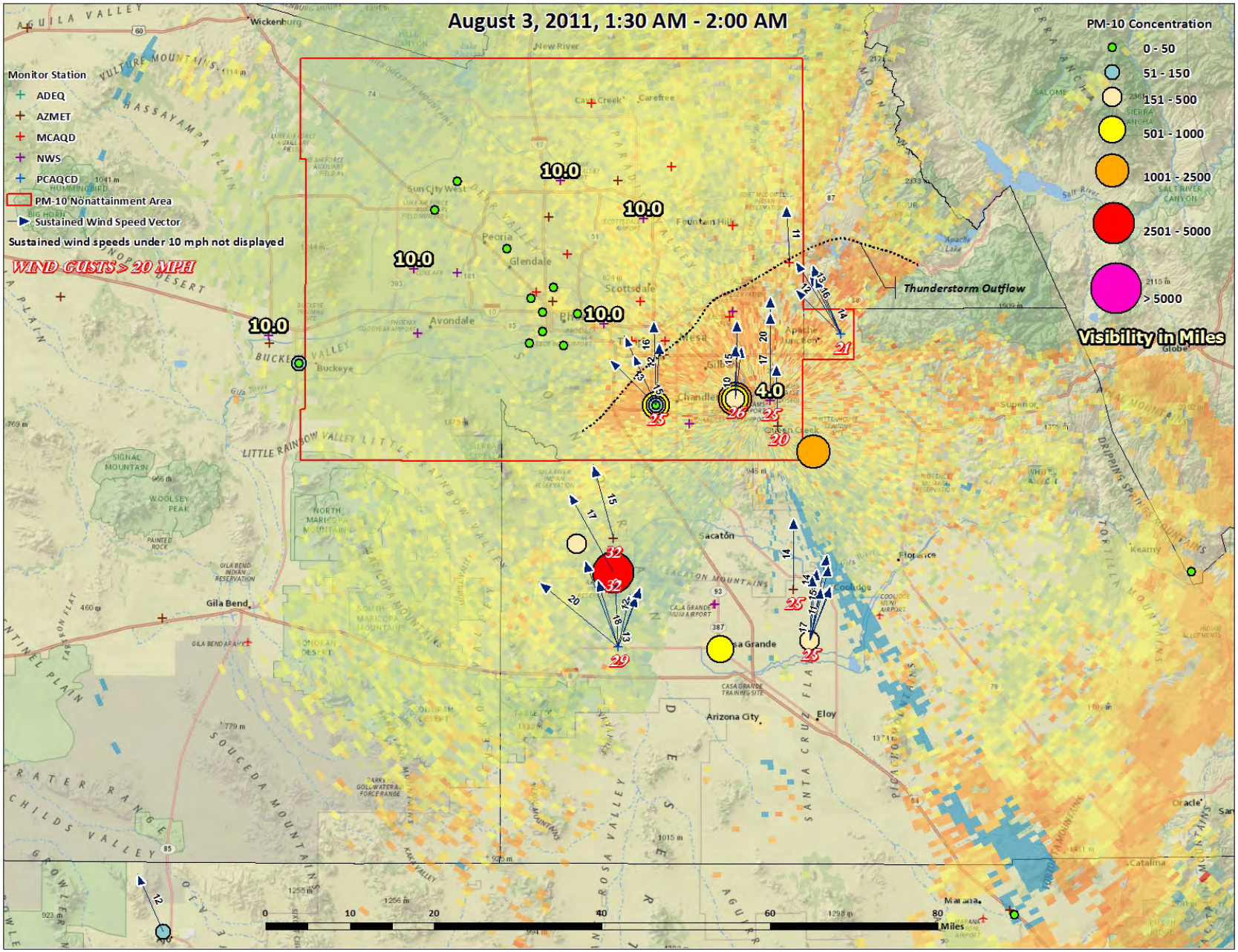


Figure 5-3. August 3, 2011, 1:30 AM – 2:00 AM.

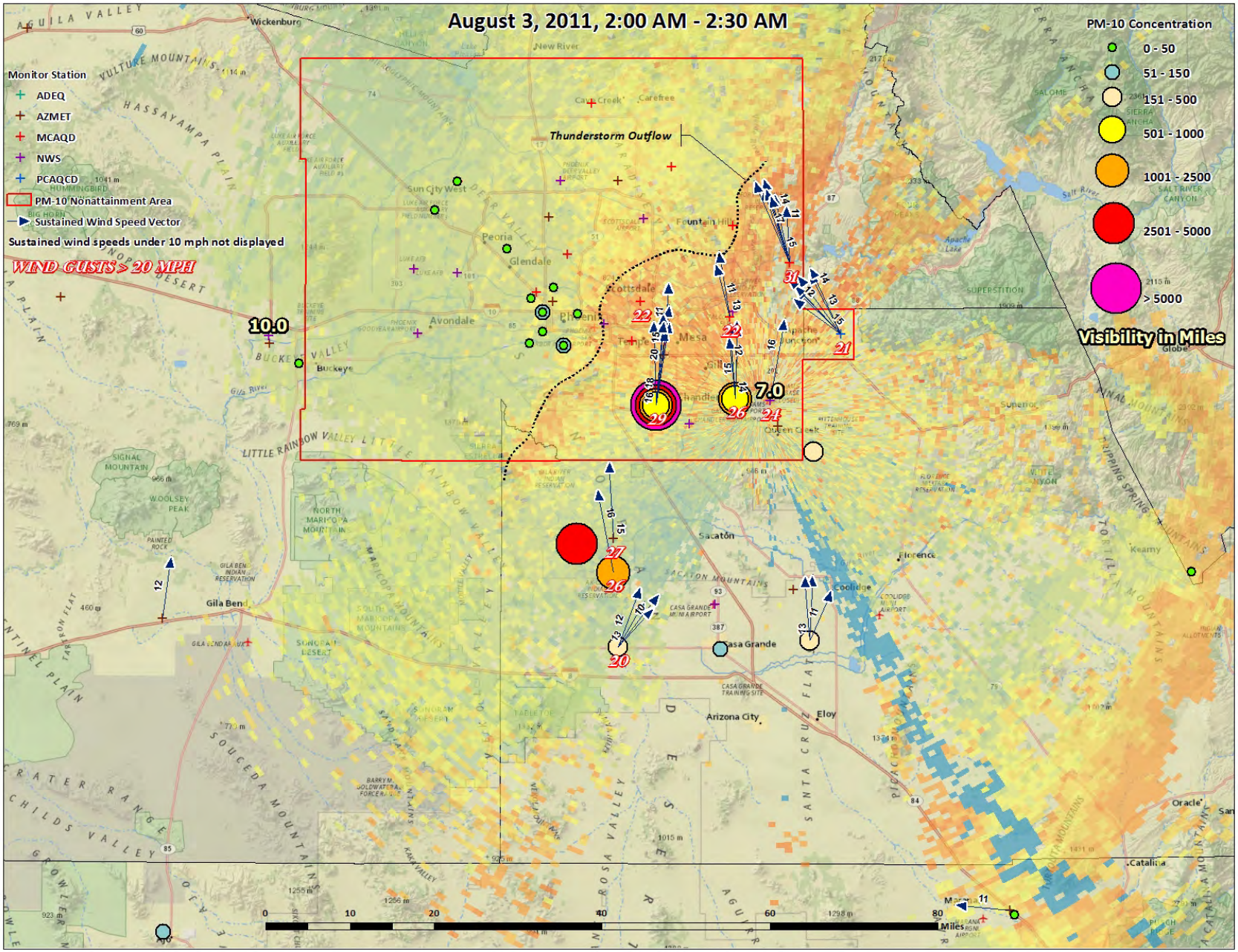


Figure 5-4. August 3, 2011, 2:00 AM – 2:30 AM.

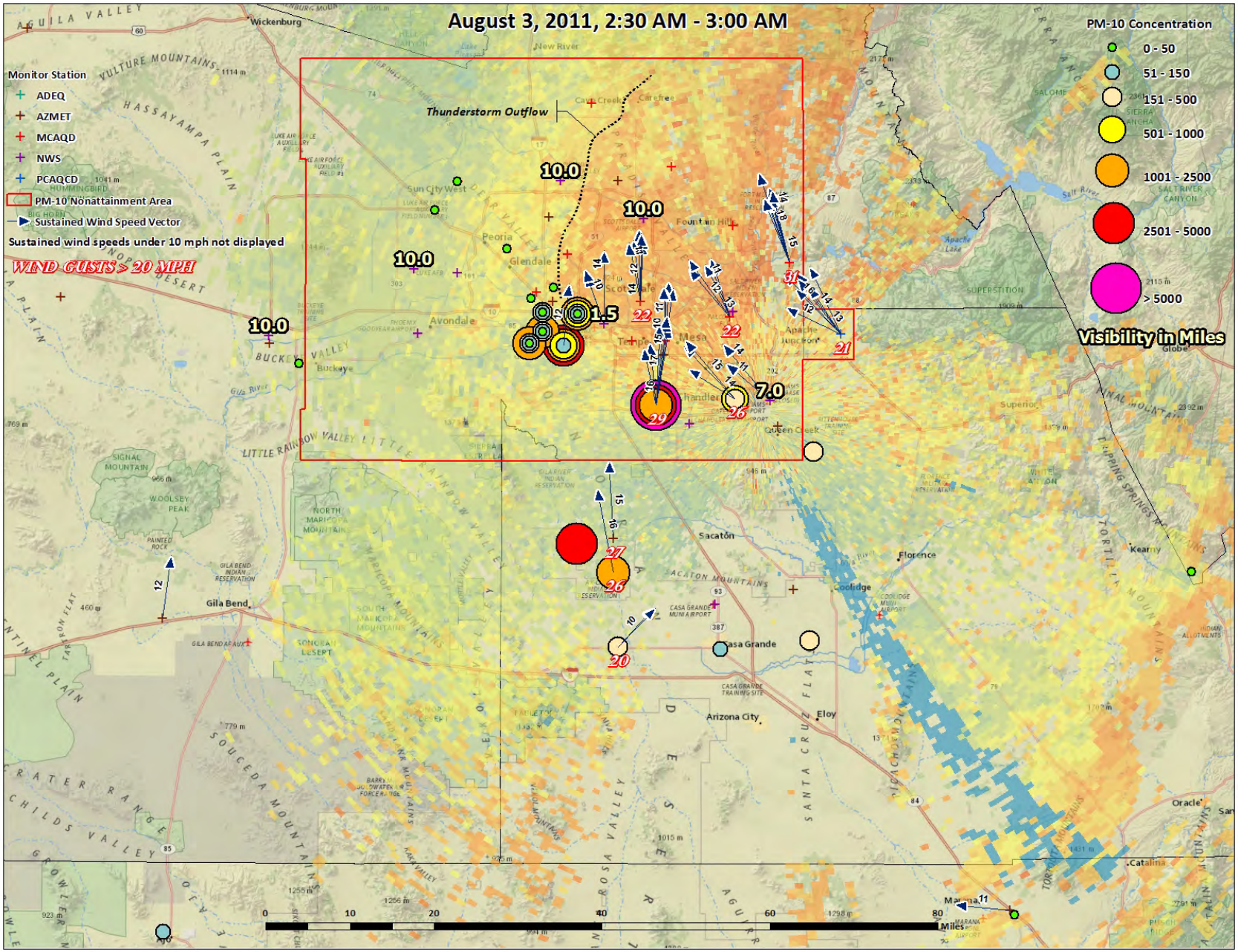


Figure 5-5. August 3, 2011, 2:30 AM – 3:00 AM.

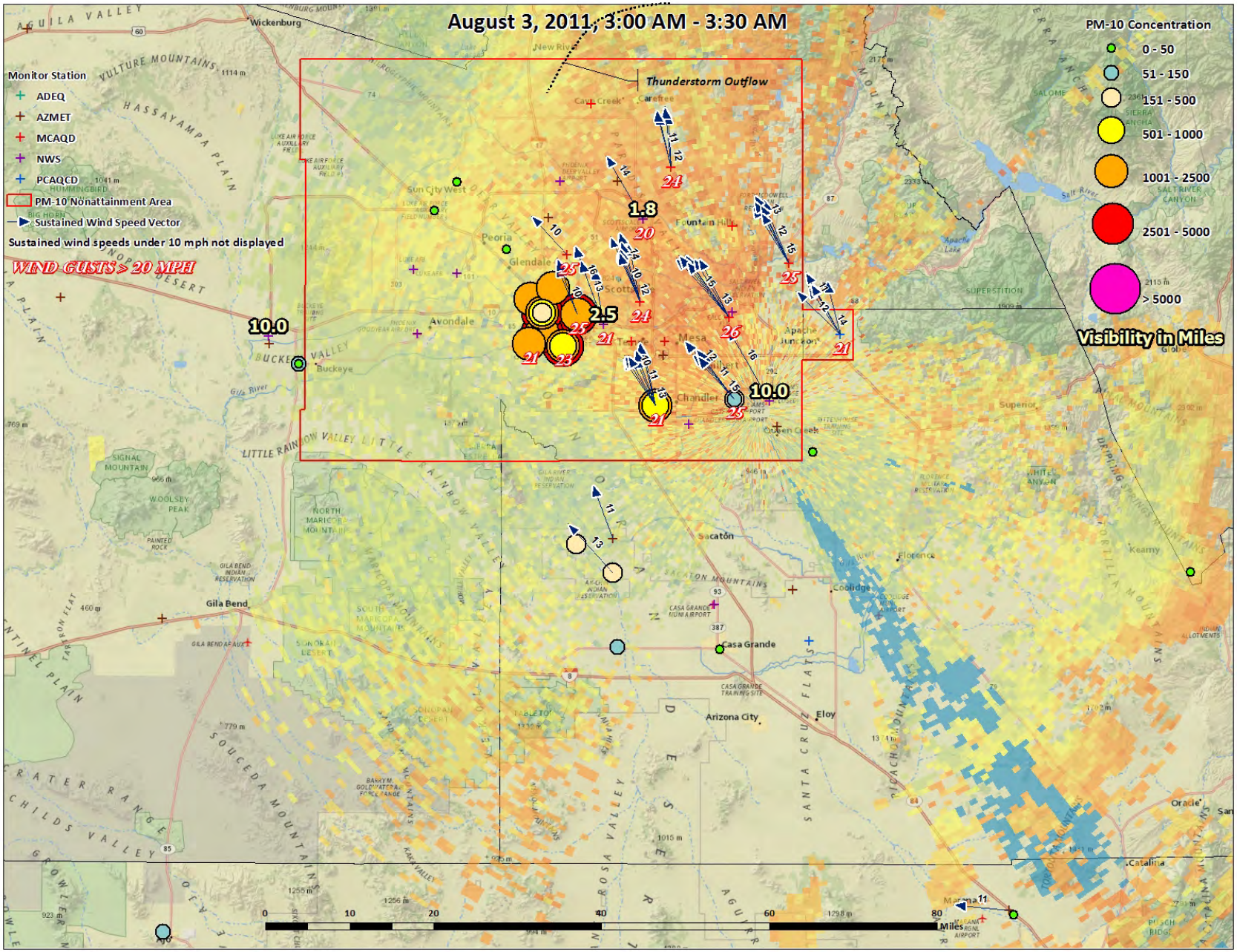


Figure 5-6. August 3, 2011, 3:00 AM – 3:30 AM.

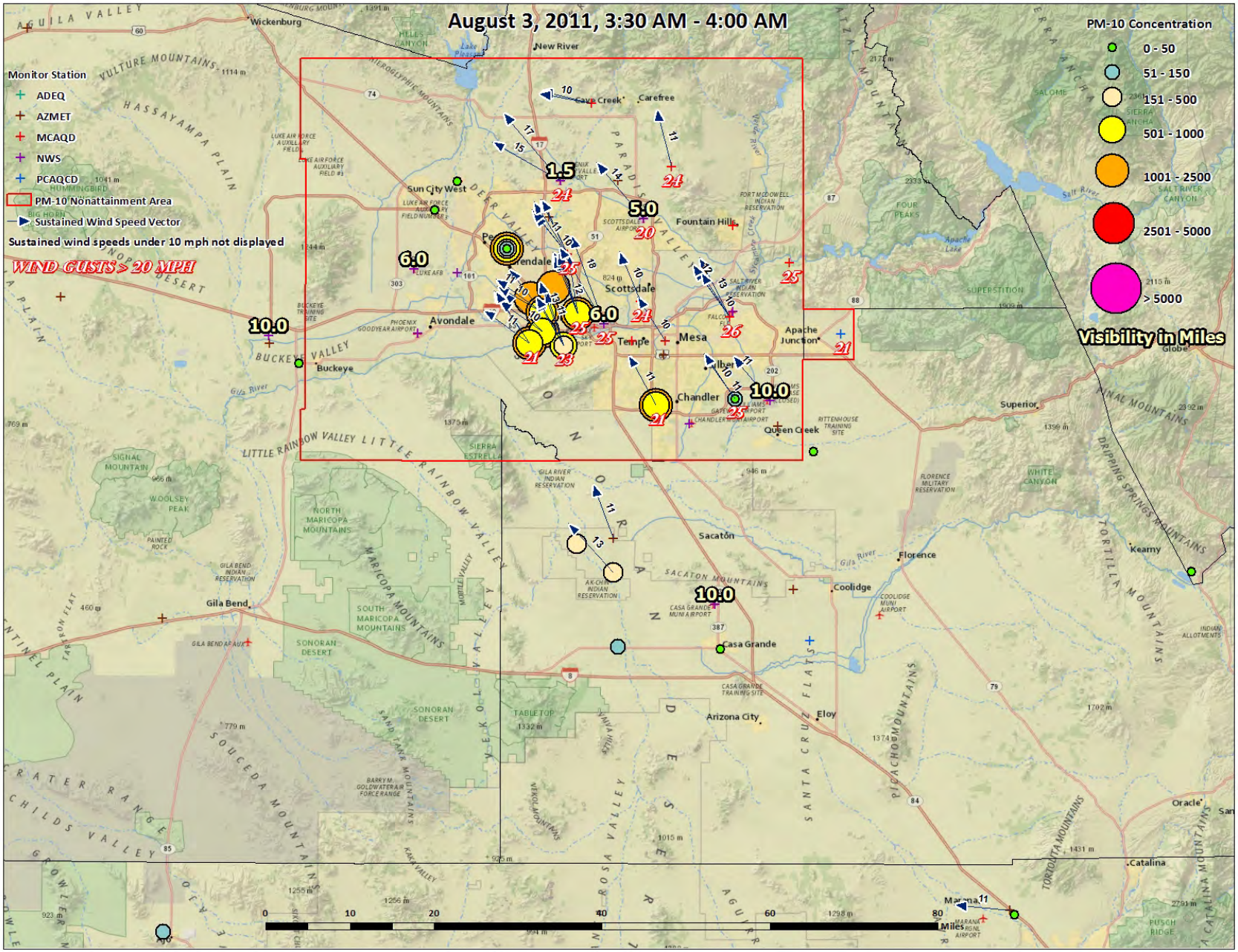


Figure 5-7. August 3, 2011, 3:30 AM – 4:00 AM.

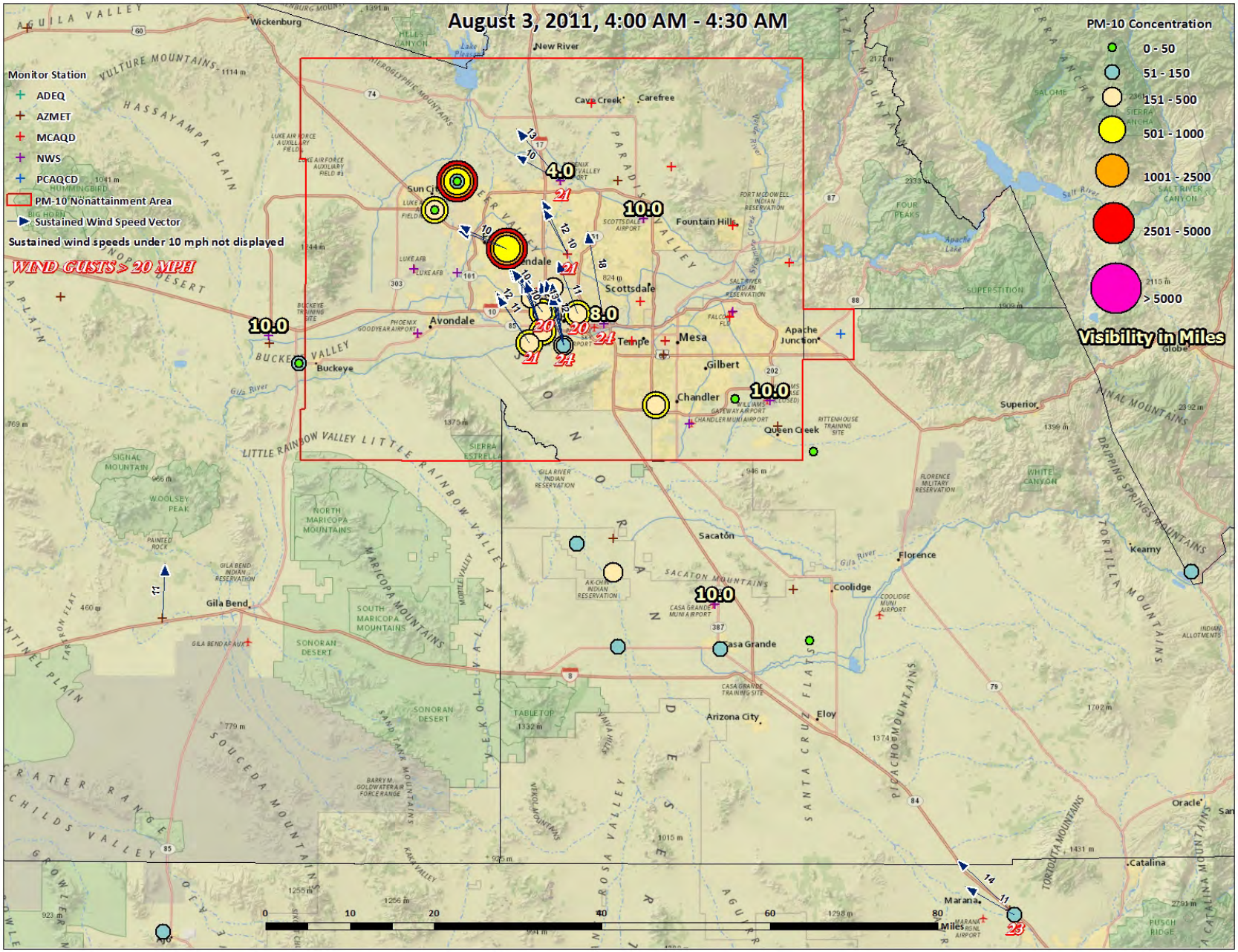


Figure 5-8. August 3, 2011, 4:00 AM – 4:30 AM.

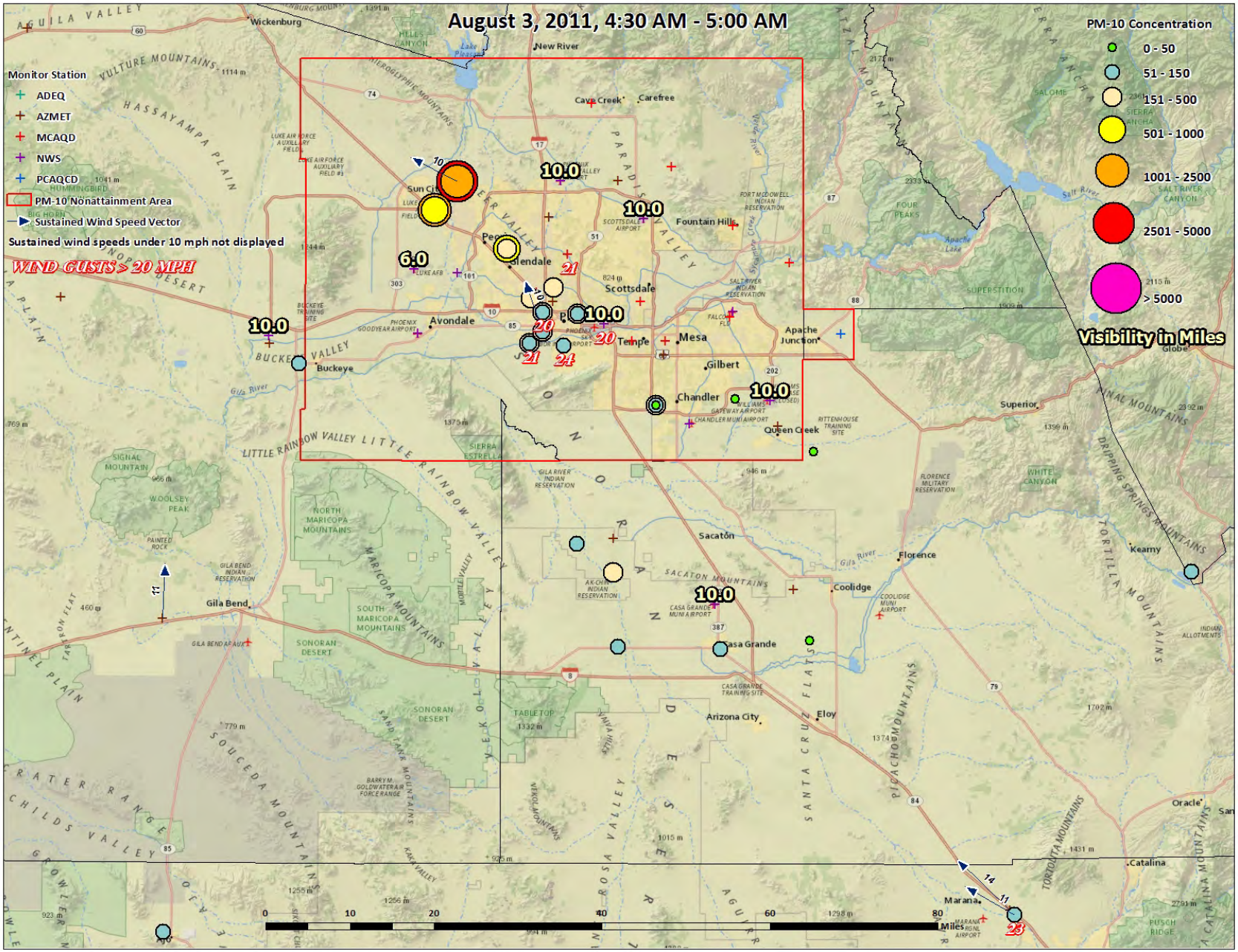


Figure 5-9. August 3, 2011, 4:30 AM – 5:00 AM.

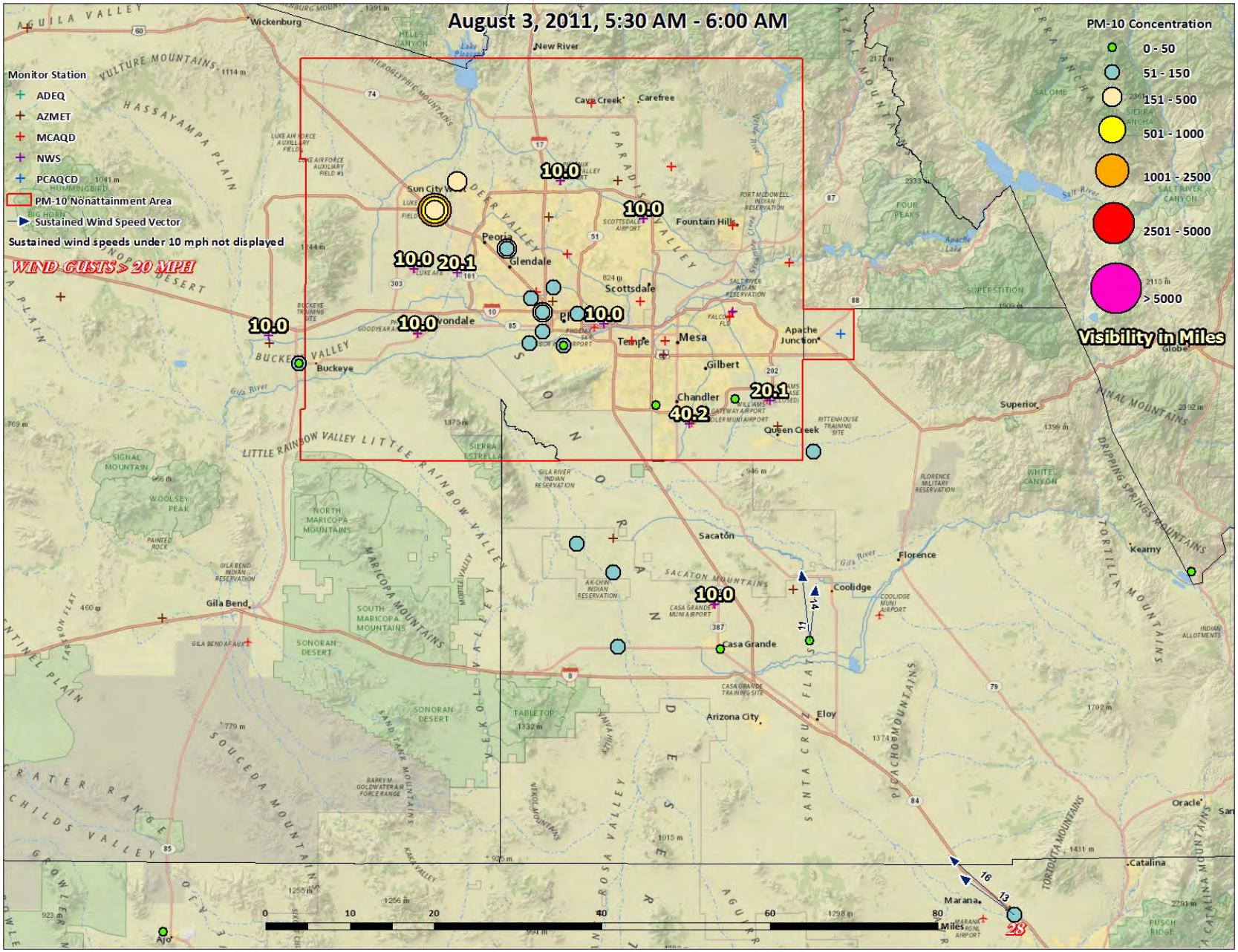


Figure 5-10. August 3, 2011, 5:30 AM – 6:00 AM.

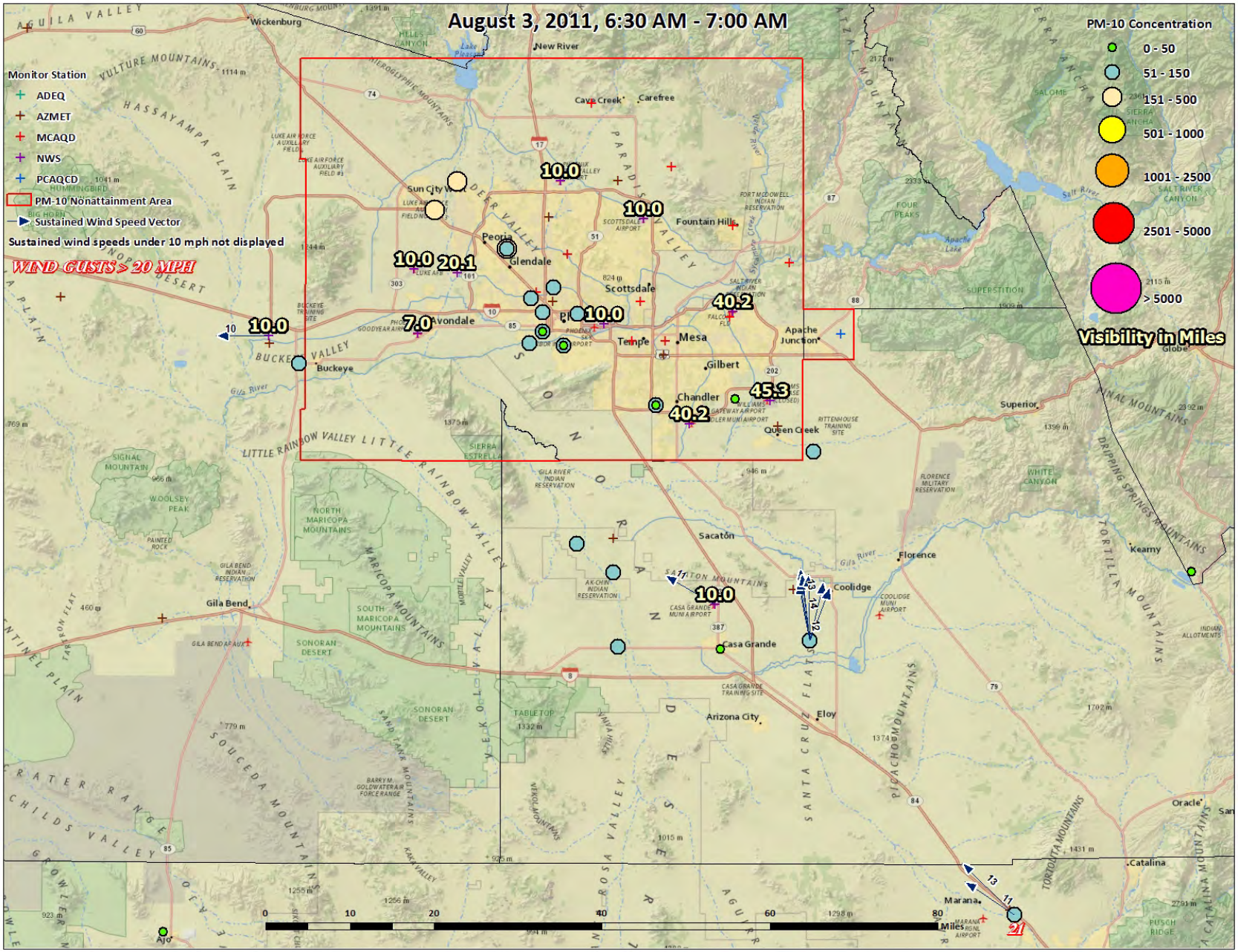


Figure 5-11. August 3, 2011, 6:30 AM – 7:00 AM

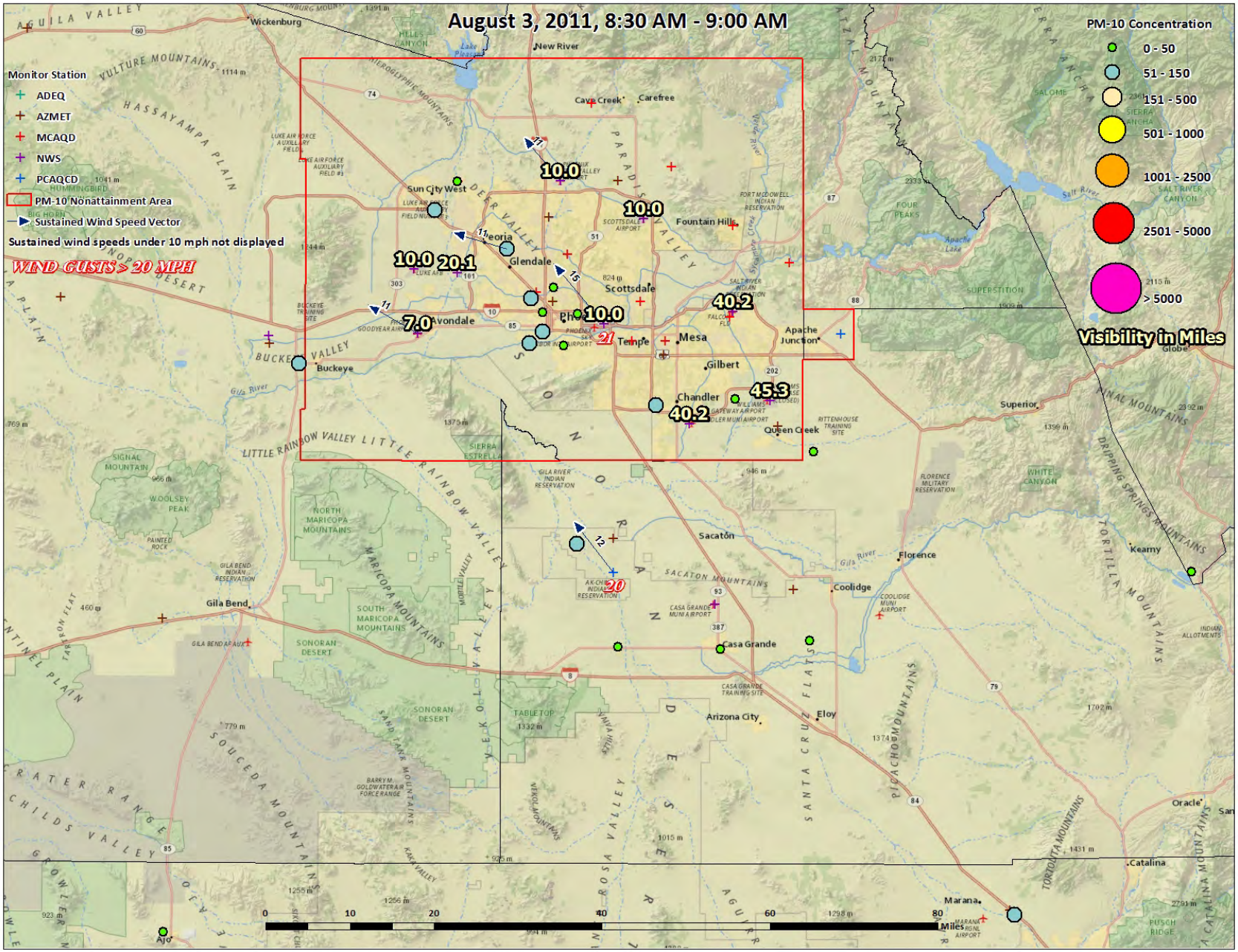


Figure 5-12. August 3, 2011, 8:30 AM – 9:00 AM.

Visibility Photos

Figure 5–13 displays time-stamped photos taken by the Camelback Mountain visibility camera. A photo before, during, and after the event from the camera has been selected. Because the event occurred in the evening hours, the visibility photos do not show the dramatic effects on visibility that can be perceived during daylight hours. However, these images still convey show the good visibility before the arrival of the transported outflow dust, the poor visibility due to blowing dust as the outflow winds arrive, and the moderate hazy conditions at sunrise, due to the lingering suspended dust from the event. These images provide additional evidence for a clear causal connection between the transported windblown dust from thunderstorm outflow winds with the high PM10 concentrations at monitors throughout the nonattainment area. The regional nature of the windblown dust in the images also highlights the unlikelihood of controllable anthropogenic sources being the source of the windblown dust.

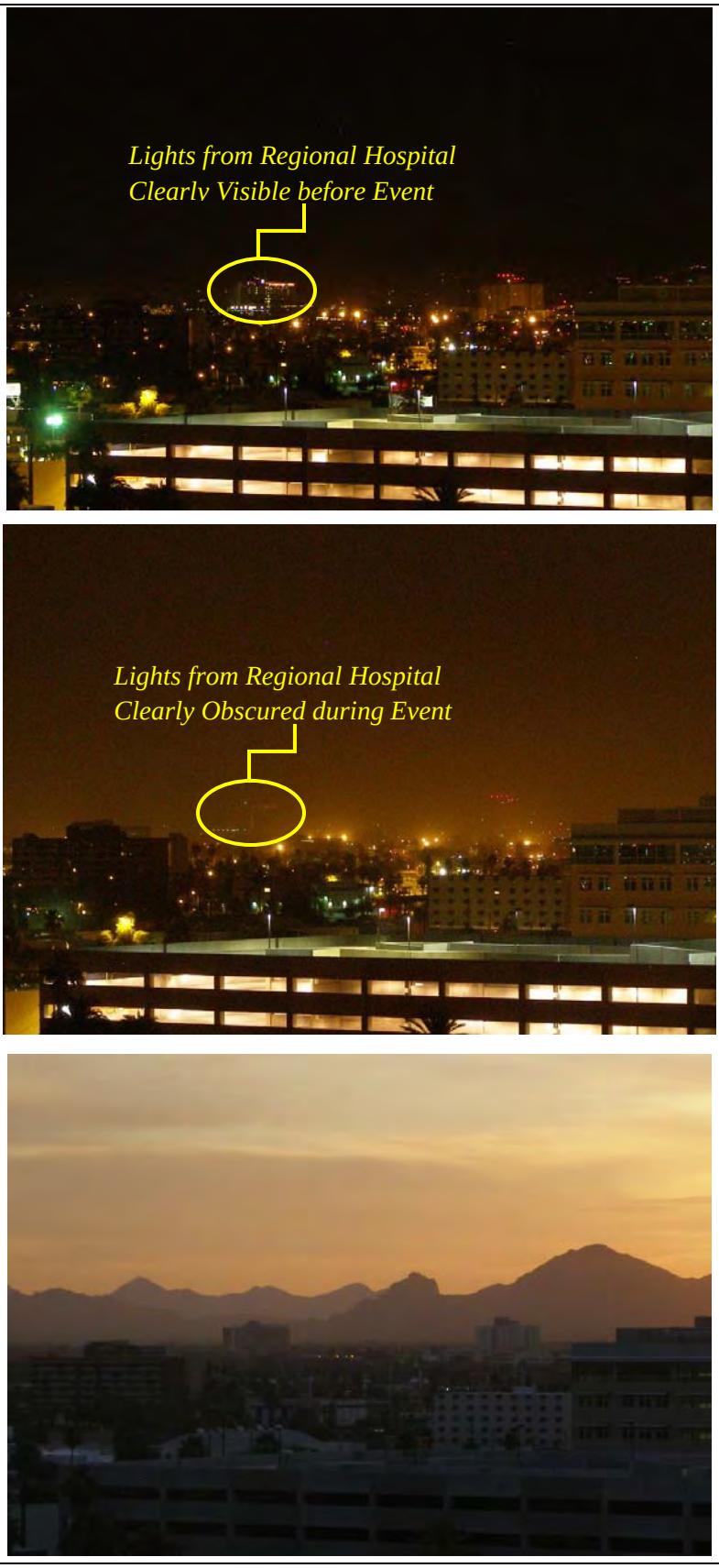


Figure 5-13. Visibility photos looking northeast towards Camelback Mountain in Phoenix at 12:00 AM, 3:00 AM, and 6:00 AM respectively.

Conclusion

The information presented within this section has adequately demonstrated a clear causal relationship between the emissions generated by uncontrollable natural events and the exceedances measured at the West Chandler monitor. The maps and visibility photos provided in this section contain an illustration of the event as it unfolded. The series of maps for the event show a spatial and temporal representation of the thunderstorm outflow winds and associated windblown dust as they move throughout Maricopa and Pinal counties. These maps and visibility photos show a clear causal connection between the windblown dust generated and transported by the thunderstorm outflow winds and the exceedance at the West Chandler monitor. The particular wind magnitudes and wind direction, and the proximity of the exceeding monitor to open and desert areas of Pinal County provide solid evidence as to why only one monitor within the Maricopa County nonattainment area recorded an exceedance. It is clear from these data that thunderstorm outflow winds transported uncontrollable windblown PM10 emissions to the West Chandler monitor, demonstrating a clear causal connection between the event and the exceedance.

VI. "BUT FOR" ANALYSIS

Section 50.14(c)(3)(iv)(D) in 40 CFR part 50 requires that an exceptional event demonstration must satisfy that "[t]here would have been no exceedance or violation but for the event." The prior sections of this submittal have provided detailed information that the exceedance on August 3, 2011 was not reasonably controllable or preventable and there is a clear causal relationship between the windblown dust generated and transported by thunderstorm outflow winds and the exceedance at the West Chandler monitor. The weight of evidence in these sections demonstrates that but for the existence of windblown dust emissions generated and transported by thunderstorm outflow winds, there would have been no exceedance of the 24-Hour PM10 standard.

As detailed in Section IV, all reasonable control measures were in place and actively enforced before, during, and after the exceedance on August 3, 2011. Inspection and compliance data of local fugitive dust sources during this time period revealed that PM10 from anthropogenic activities was well controlled and constant. Local regulatory agencies, industry and the general public were alerted to the arrival of the storm through daily forecast and a dust storm warning issued by the National Weather Service. Real-time surveillance of PM10 monitoring stations during the event established a clear link between rapidly rising PM10 concentrations and the arrival of the thunderstorm outflow winds. As shown in Figure 6–1, PM10 concentrations in the hour before the event at the exceeding West Chandler monitor were at normal levels, indicating no significant anthropogenic activities. PM10 concentrations in the hours after the event show a quick return to low levels once transported dust from the thunderstorm outflow passed the monitoring station.

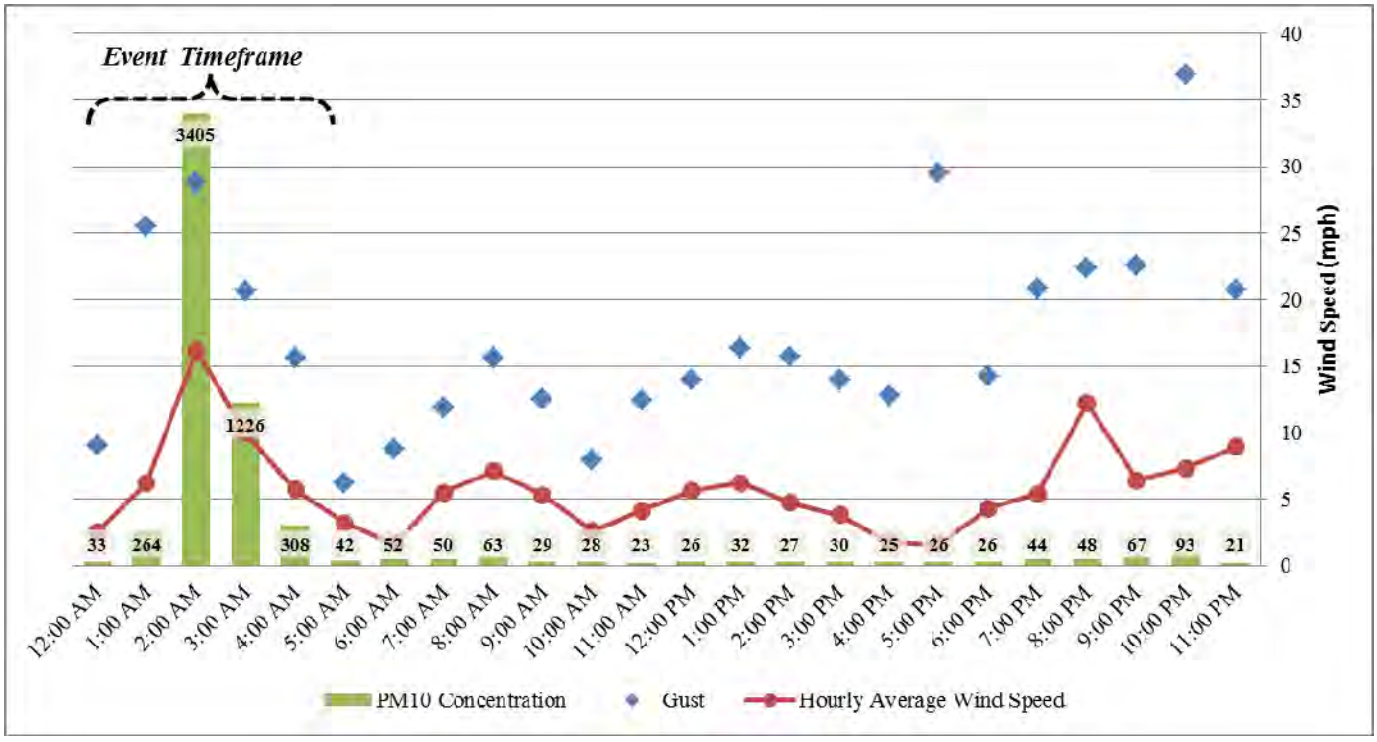


Figure 6-1. Hourly PM10 concentration, wind gust, and average wind speed as recorded at the exceeding West Chandler monitor.

As shown in Section V, detailed, time series maps establish a clear causal relationship between the arrivals of windblown dust generated by thunderstorm outflow winds and elevated PM10 concentrations at the monitors. The particular wind magnitudes and wind direction, and the proximity of the exceeding monitor to open and desert areas of Pinal County provide solid evidence as to why only one monitor within the Maricopa County nonattainment area recorded an exceedance.

The body of evidence presented in this submittal confirms that the exceedance on August 3, 2011 was a natural event and that there would have been no exceedance but for the presence of the uncontrollable windblown dust from the thunderstorm outflow winds.

VII. CONCLUSIONS

The exceedance that occurred on August 3, 2011 satisfies the criteria of 40 CFR 50.1(j) and meets the definition of an exceptional event. These criteria are:

- The event affects air quality.
- The event is not reasonably controllable or preventable.
- The event is unlikely to reoccur at a particular location or [is] a natural event.

A. Affects Air Quality

As stated in the preamble to the Exceptional Events Rule, the event in question is considered to have affected air quality if it can be shown that there is a clear causal relationship between the monitored exceedance and the event, and that the event is associated with a measured concentration in excess of normal historical fluctuations. Given the information presented in Sections II, III, IV and V, it is reasonable to conclude that the event in question affected air quality.

B. Not Reasonably Controllable or Preventable

Section 50.1(j) of Title 40 CFR Part 50 requires that an event must be "not reasonably controllable or preventable" in order to be defined as an exceptional event. This requirement is met by demonstrating that despite reasonable control measures in place within Maricopa County and the Phoenix PM10 nonattainment area, high wind conditions overwhelmed all reasonably available controls. Despite the deployment of comprehensive control measures and sophisticated response programs, high wind conditions associated with thunderstorms and thunderstorm outflows brought high concentrations of PM10 emissions into the Phoenix PM10 nonattainment area. The event discussed in this document that caused the exceedance in this request (see Sections II and V) was caused by thunderstorm driven outflow winds that transported dust into Maricopa County from areas largely outside of the Phoenix PM10 nonattainment area. The fact that these were natural events involving strong thunderstorm outflow winds that transported PM10 emissions into Maricopa County, with a majority of the PM10 emissions recorded by Maricopa County area monitors coming from sources outside of the Phoenix PM10 nonattainment area, provides strong evidence that the event and exceedance of August 3, 2011 recorded at the West Chandler monitor was not reasonably controllable or preventable.

C. Natural Event

As discussed above, the event shown to cause this exceedance was emissions of PM10 driven by high winds caused by thunderstorm activity and related outflow boundaries on August 3, 2011. The event therefore qualifies as a natural event.

In summary, the exceedance of the federal 24-hour PM10 standard on August 3, 2011, would not have occurred but for the monsoonal thunderstorm driven high winds and windblown dust transport from areas largely outside the nonattainment area, based on the following weight of evidence:

- Historical Fluctuation data in Section III showing five years of 24-hour average data for the West Chandler monitor demonstrates that the values on August 3, 2011 were atypical and in excess of normal historical fluctuations.

- The Exceedance of the PM10 standard recorded on August 3, 2011, is tied to thunderstorm activity and thunderstorm generated outflow winds, as can be seen in radar imagery analyses in Section V.

- Figures in Section V show that the timing of thunderstorm generated outflow boundary passage and increases in wind speeds at monitoring locations and National Weather Service stations during the event are consistent with the timing of elevated PM10 concentrations recorded at the monitoring locations in the nonattainment area.

- Wind directions, thunderstorm generated outflow boundary propagation, and concentration patterns showing elevated levels of PM10 in Pinal County prior to levels increasing in Maricopa County, all depicted in Section V, help show that a vast majority of the dust that impacted the nonattainment area monitors originated in Pinal County and was transported to the nonattainment area. The particular wind magnitudes and wind direction, and the proximity of the exceeding monitor to open and desert areas of Pinal County provide solid evidence as to why only one monitor within the Maricopa County nonattainment area recorded an exceedance.

- Section IV discusses rules that are in place in the nonattainment area as well as inspections that were conducted in the area to verify compliance with those rules in order to show that the event was not reasonably controllable or preventable. Additionally, the visibility photos provided in Section V also help to illustrate the magnitude and scale of this event which supports the claim that the exceedance recorded at the West Chandler monitor was not reasonably controllable or preventable.

APPENDIX A

ADEQ FORECAST PRODUCTS FOR PHOENIX AND MARICOPA COUNTY

MARICOPA COUNTY DUST CONTROL FORECAST

ISSUED TUESDAY, AUGUST 02, 2011

Five-day weather outlook:

DURING ACTIVE SUMMER MONSOON EPISODES STRONG GUSTY WINDS AND DENSE BLOWING DUST ARE POSSIBLE EVEN FROM DISTANT THUNDERSTORMS

A prolonged break in the summer monsoon circulation pattern will begin on Wednesday for the Phoenix metro area as dry southwesterly flow aloft returns due to an encroaching upper level trough from the west. This means that no local thunderstorm activity or outflow-boundary generated dust is expected. In the meantime, low-level gradients will support breezy to gusty westerly winds each afternoon.

R I S K F A C T O R S

	WINDS		STAGNATION		UNHEALTHY PM-10 RISK LEVEL
Day 1: Wed 08/03/2011	Westerly 10-20 mph during the afternoon.	+	No significant stagnation expected.	=	**LOW**
Day 2: Thu 08/04/2011	Westerly 10-20 mph during the afternoon.	+	No significant stagnation expected.	=	**LOW**
Day 3: Fri 08/05/2011	Westerly 10-20 mph during the afternoon	+	No significant stagnation expected.	=	**LOW**
EXTENDED OUTLOOK					
Day 4: Sat 08/06/2011	Westerly 10-20 mph during the afternoon	+	No significant stagnation expected.	=	**LOW**
Day 5: Sun 08/07/2011	Westerly 10-20 mph during the afternoon	+	No significant stagnation expected.	=	**LOW**

The Maricopa County Dust Control Action Forecast is issued to assist in the planning of work activities to help reduce dust pollution. A recorded message of this forecast can be accessed at 602-771-2368. To review the complete air quality forecast for the Phoenix metropolitan area, as well as the health impacts and reduction methods for different air pollutants, call 602-771-2367 for recorded forecast information or click on ADEQ's Air Quality Forecast at http://www.azdeq.gov/environ/air/ozone/ensemble.pdf.

CKR 04/28/2011

ADEQ Arizona Department of Environmental Quality

VERY UNHEALTHY (201-300)

UNHEALTHY (151-200)

UNHEALTHY FOR SENSITIVE GROUPS (101-150)

MODERATE (51-100)

GOOD (0-50)

For more information visit:
http://www.airnow.gov/index.cfm?action=aqibasics.aqi

NEW!!! CLICK HERE FOR UPDATED OZONE SEASON STATS NEW!!!

AIR QUALITY FORECAST FOR WEDNESDAY, AUGUST 03, 2011

This report is updated by 1:00 p.m. Sunday thru Friday and is valid
for areas within and bordering Maricopa County in Arizona

FORECAST DATE **NOTICES** (*SEE BELOW FOR DETAILS) AIR POLLUTANT	YESTERDAY MON 08/01/2011 **DUST** Highest AQI Reading/Site (Preliminary data only)	TODAY TUE 08/02/2011 **OZONE HEALTH WATCH** **DUST** **NWS EXCESSIVE HEAT WARNING**	TOMORROW WED 08/03/2011 **OZONE HEALTH WATCH (EXTENSION)** **NWS EXCESSIVE HEAT WARNING**	EXTENDED THU 08/04/2011 **NONE** **NWS EXCESSIVE HEAT WARNING**
O3*	**100** **QUEEN VALLEY**	**93** **MODERATE**	**93** **MODERATE**	**74** **MODERATE**
CO*	**06** **GREENWOOD**	**07** **GOOD**	**06** **GOOD**	**05** **GOOD**
PM-10*	**25** **GREENWOOD**	**75** **MODERATE**	**42** **GOOD**	**40** **GOOD**
PM-2.5*	**25** **SOUTH PHOENIX & WEST PHOENIX**	**34** **GOOD**	**28** **GOOD**	**26** **GOOD**

* O3 = Ozone CO = Carbon Monoxide PM-10 = Particles 10 microns & smaller PM-2.5 = Particles smaller than 2.5 microns

*"Ozone Health Watch" means that the highest concentration of OZONE may approach the federal health standard.
"PM-10 or PM-2.5 Health Watch" means that the highest concentration of PM-10 or PM-2.5 may approach the federal health standard.
"High Pollution Advisory" means that the highest concentration of OZONE, PM-10, or PM-2.5 may exceed the federal health standard.
"DUST" means that short periods of high PM-10 concentrations caused by outflow from thunderstorms are possible.

Health message for Tuesday, August 02: Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.

Health message for Wednesday, August 03: Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.

Synopsis and Discussion

OZONE: TODAY'S OZONE HEALTH WATCH HAS BEEN EXTENDED THRU WEDNESDAY AUGUST 03

Another near-exceedance of the 8-hour average ozone standard occurred at the Queen Valley monitoring site on Monday. This indicates that afternoon winds have begun to take on a westerly component although several central city locations had uncomfortably high ozone concentrations as well. Believe that locations over the east Valley will remain most at risk for near-to-unhealthy ozone levels today and tomorrow due to day-to-day carry-over as well as an increasing afternoon westerly surface wind component; as a result, the existing Ozone Health Watch has been extended thru Wednesday. As of 11:00 a.m. six monitoring sites had hourly ozone concentrations of 70 parts per billion or higher. An eventual downward trend in ozone concentrations is still expected once afternoon westerly winds increase into the 15-20+ mph range since this situation tends to keep the Valley ozone plume from lingering over the metro area and usually prevents high accumulation episodes.

PARTICLES: A prolonged break in the summer monsoon circulation pattern will begin on Wednesday for the Phoenix metro area as dry southwesterly flow aloft returns due to an encroaching upper level trough from the west. This means that no local thunderstorm activity or outflow-boundary generated dust is expected. In the meantime, low-level gradients will support breezy to gusty westerly winds each afternoon.

MONITORING SITE MAPS: STATIC MAP - http://www.azdeq.gov/environ/air/monitoring/images/map.jpg
INTERACTIVE MAPS - http://aqwww.maricopa.gov/AirMonitoring/SitePollutionMap.aspx
http://www.airnow.gov/

POLLUTION MONITOR READINGS FOR MONDAY, AUGUST 01, 2011

O3 (OZONE)

Info on current 8-hour ozone standard: http://www.epa.gov/air/ozonepollution/pdfs/2008_03_aqi_changes.pdf
For archived AQI maps go to: http://www.airnow.gov/index.cfm?action=airnow.maps

SITE NAME	MAX 8-HR VALUE (PPB)	MAX AQI	AQI COLOR CODE
Alamo Lake (La Paz County)	51	43	
Apache Junction (Pinal County)	62	58	
Blue Point	62	58	
Buckeye	55	47	
Casa Grande (Pinal County)	60	51	
Cave Creek	67	74	
Central Phoenix	69	80	
Dysart	61	54	
Falcon Field	60	51	
Fountain Hills	69	80	
Glendale	66	71	
Humboldt Mountain	63	61	
North Phoenix	72	90	
Phoenix Supersite	NOT AVBL	NOT AVBL	NOT AVBL
Pinal Air Park (Pinal County)	61	54	
Pinnacle Peak	65	67	
Queen Valley (Pinal County)	75	100	
Rio Verde	65	67	
South Phoenix	64	64	
South Scottsdale	67	74	
Tempe	63	61	
Tonto Nat'l Mon. (Gila County)	53	45	
West Chandler	66	71	
West Phoenix	68	77	
Yuma (Yuma County)	42	36	

CO (CARBON MONOXIDE)

SITE NAME	MAX 8-HR VALUE (PPM)	MAX AQI	AQI COLOR CODE
Central Phoenix	0.2	02	
Greenwood	0.5	06	
Phoenix Supersite	NOT AVBL	NOT AVBL	NOT AVBL
West Phoenix	0.1	01	

PM-10 (PARTICLES)

SITE NAME	MAX 24-HR VALUE (ug/m3)	MAX AQI	AQI COLOR CODE
Buckeye	24	22	
Central Phoenix	18	17	
Combs School(Pinal County	22	20	
Durango	22	20	
Dysart	17	16	
Glendale	17	16	
Greenwood	27	25	
Higley	17	16	
Maricopa (Pinal County)	21	19	
Phoenix Supersite	15	14	
South Phoenix	18	17	
West Chandler	16	15	
West Forty Third	20	19	
West Phoenix	25	23	
Zuni Hills	17	16	

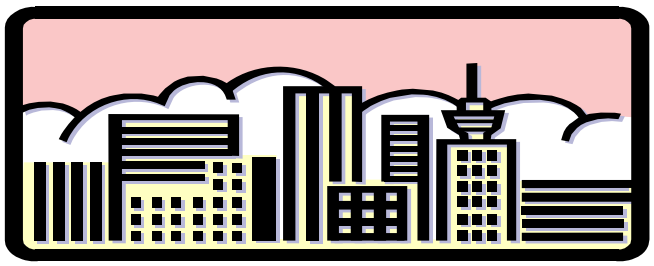
PM-2.5 (PARTICLES)

(Some data derived from light-scattering equipment)

For maps go to: http://www.airnow.gov/

SITE NAME	MAX 24-HR VALUE (ug/m3)	MAX AQI	AQI COLOR CODE
Durango	7.5	24	
Dysart	3.6	12	
Estrella Mountain Park	4.0	13	
Glendale	5.4	18	
Phoenix Supersite	6.6	21	
South Phoenix	8.0	26	
Vehicle Emissions Lab	3.3	11	
West Phoenix	8.0	26	

LOCAL AIR POLLUTANTS IN DETAIL



O3 (OZONE):

Description – This is a secondary pollutant that is formed by the reaction of other primary pollutants (precursors) such as VOCs (volatile organic compounds) and NOx (Nitrogen Oxides) in the presence of heat and sunlight.

Sources – VOCs are emitted from motor vehicles, chemical plants, refineries, factories, and other industrial sources. NOx is emitted from motor vehicles, power plants, and other sources of combustion.

Potential health impacts – Exposure to ozone can make people more susceptible to respiratory infection, result in lung inflammation, and aggravate pre-existing respiratory diseases such as asthma. Other effects include decrease in lung function, chest pain, and cough.

Unit of measurement – Parts per billion (ppb).

Averaging interval – Highest eight-hour period within a 24-hour period (midnight to midnight).

Reduction tips – Curtail daytime driving, refuel cars and use gasoline-powered equipment as late in the day as possible.

CO (CARBON MONOXIDE):

Description – A colorless, odorless, poisonous gas formed when carbon in fuels is not burned completely.

Sources – In cities, as much as 95 percent of all CO emissions emanate from automobile exhaust. Other sources include industrial processes, non-transportation fuel combustion, and natural sources such as wildfires. Peak concentrations occur in colder winter months.

Potential health impacts – Reduces oxygen delivery to the body's organs and tissues. The health threat is most serious for those who suffer from cardiovascular disease.

Unit of measurement – Parts per million (ppm).

Averaging interval – Highest eight-hour period within a 24-hour period (midnight to midnight)

Reduction tips – Keep motor vehicle tuned properly and minimize nighttime driving.

PM-10 & PM-2.5 (PARTICLES):

Description – The term "particulate matter" (PM) includes both solid particles and liquid droplets found in air. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. Particles less than 10 micrometers in diameter tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter are referred to as "fine" particles and are responsible for many visibility degradations such as the "Valley Brown Cloud" (see http://www.phoenixvis.net/). Particles with diameters between 2.5 and 10 micrometers are referred to as "coarse".

Sources – Fine = All types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Coarse = crushing or grinding operations and dust from paved or unpaved roads.

Potential health impacts – PM can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases, such as asthma and chronic bronchitis.

Units of measurement – Micrograms per cubic meter (ug/m3)

Averaging interval – 24 hours (midnight to midnight).

Reduction tips – Stabilize loose soils, slow down on dirt roads, carpool, and use public transit.

{**Updated 03/23/2010**}

APPENDIX B

NATIONAL WEATHER SERVICE METEOROLOGICAL OBSERVATIONS AND STORM REPORTS

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
PHOENIX SKY HARBOR INTL AIRPORT (23183)
PHOENIX, AZ
(08/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1107 ft. above sea level
Latitude: 33.427
Longitude: -112.003
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0051	11	FEW110 SCT250	10.00		96	35.6	71	21.7	58	14.4	28	6	240		28.56			29.66	AA		29.73
03	0151	11	FEW110 SCT250	10.00		95	35.0	71	21.8	59	15.0	30	6	200		28.59	3	010	29.69	AA		29.76
03	0241	11	FEW110 SCT250	1.75	HZ	97	36.0	71	21.6	57	14.0	26	10	160		28.60			M	SP		29.77
03	0249	11	BKN012 BKN110 BKN250	1.50	HZ	95	35.0	70	21.3	57	14.0	28	14	180		28.60			M	SP		29.77
03	0251	11	BKN012 BKN110 BKN250	1.50	HZ	95	35.0	70	21.3	57	13.9	28	11	160		28.60			29.70	AA		29.77
03	0303	11	BKN012 BKN110 BKN250	1.25	HZ	93	34.0	70	20.9	57	14.0	30	11	170		28.60			M	SP		29.77
03	0312	11	BKN012 BKN110 BKN250	1.75	HZ	93	34.0	70	20.9	57	14.0	30	16	160	22	28.60			M	SP		29.77
03	0320	11	BKN012 BKN110 BKN250	2.50	HZ	93	34.0	70	20.9	57	14.0	30	13	160	21	28.61			M	SP		29.78
03	0337	11	BKN012 BKN110 BKN250	5.00	HZ	93	34.0	70	20.9	57	14.0	30	17	150	25	28.62			M	SP		29.79
03	0351	11	BKN012 BKN110 BKN250	6.00	HZ	93	33.9	70	20.9	57	13.9	30	18	160	25	28.61			29.71	AA		29.78
03	0403	11	BKN110 BKN250	8.00		93	34.0	70	20.9	57	14.0	30	18	170	24	28.61			M	SP		29.78
03	0451	11	SCT140 BKN250	10.00		91	32.8	70	21.2	59	15.0	34	8	140	20	28.62	1	011	29.72	AA		29.79
03	0551	11	SCT140 BKN250	10.00		91	32.8	70	21.2	59	15.0	34	7	120		28.63			29.73	AA		29.80
03	0651	11	FEW075 SCT140 SCT250	10.00		93	33.9	70	21.2	58	14.4	31	7	070		28.64			29.74	AA		29.81
03	0751	11	FEW075 SCT140 SCT250	10.00		93	33.9	70	21.2	58	14.4	31	15	130	22	28.66	3	017	29.77	AA		29.84
03	0851	11	FEW075 SCT140 SCT200	10.00		94	34.4	70	21.1	57	13.9	29	15	140	21	28.68			29.78	AA		29.85
03	0951	11	FEW090 SCT140 BKN250	10.00		96	35.6	70	21.2	56	13.3	26	11	170		28.66			29.78	AA		29.84
03	1051	11	FEW100 SCT140 SCT250	10.00		101	38.3	72	21.9	56	13.3	22	9	160		28.66	8	002	29.76	AA		29.84
03	1151	11	FEW110 SCT140 SCT250	10.00		105	40.6	73	22.5	56	13.3	20	7	VR		28.64			29.74	AA		29.81
03	1251	11	FEW110 SCT160 SCT250	10.00		104	40.0	72	22.1	55	12.8	20	0	000		28.61			29.71	AA		29.78
03	1351	11	FEW120 SCT160 SCT250	10.00		108	42.2	72	22.3	53	11.7	16	6	VR		28.58	8	027	29.68	AA		29.75
03	1451	11	FEW120 SCT160 SCT250	10.00		110	43.3	72	22.3	52	11.1	15	9	240		28.55			29.64	AA		29.72
03	1551	11	FEW120 SCT160 SCT250	10.00		109	42.8	72	22.4	53	11.7	16	0	000		28.52			29.62	AA		29.69
03	1651	11	FEW120 SCT160 SCT250	10.00		110	43.3	73	22.5	53	11.7	15	9	360		28.50	6	027	29.60	AA		29.67
03	1751	11	FEW120 SCT160 BKN250	10.00		108	42.2	72	22.2	53	11.7	16	6	220		28.49			29.59	AA		29.66
03	1851	11	FEW080 SCT110TCU	10.00		106	41.1	72	22.2	54	12.2	18	13	160	20	28.50			29.60	AA	0.01	29.67
03	1909	11	FEW080CB SCT110CB	10.00		100	38.0	74	23.1	61	16.0	28	9	120	22	28.52			M	SP		29.69
03	1951	11	FEW080 SCT110 BKN180	10.00		102	38.9	73	22.6	58	14.4	23	7	160		28.52	3	007	29.62	AA	T	29.69
03	2049	11	FEW080 SCT120 BKN180	10.00		99	37.0	71	21.9	57	14.0	25	20	360	28	28.58			M	SP		29.75
03	2051	11	FEW080 BKN120 BKN180	10.00		97	36.1	71	21.8	58	14.4	27	24	360	30	28.59			29.69	AA		29.76
03	2058	11	BKN110 BKN210 BKN250	10.00		97	36.0	71	21.6	57	14.0	26	16	020	30	28.60			M	SP		29.77
03	2101	11	BKN110CB BKN210 BKN250	9.00	TS	95	35.0	72	22.3	61	16.0	32	10	040	28	28.60			M	SP		29.77
03	2151	11	FEW028CB OVC110CB	10.00	TS	90	32.0	76	24.4	70	21.0	52	9	220		28.62			29.72	AA	0.09	29.79
03	2220	11	FEW028CB SCT065 BKN110	10.00		90	32.0	74	23.1	66	19.0	45	16	070		28.64			M	SP		29.81
03	2233	11	FEW028CB SCT065 BKN110	10.00		84	29.0	72	22.1	66	19.0	55	13	100		28.64			M	SP		29.81
03	2251	11	FEW028CB SCT065 BKN110	10.00		85	29.4	73	22.9	68	20.0	57	15	080		28.64	1	038	29.74	AA	0.07	29.81
03	2304	11	SCT065 BKN110 BKN210	10.00		84	29.0	74	23.5	70	21.0	63	14	090		28.63			M	SP		29.80
03	2351	11	SCT065 BKN110 BKN210	10.00		85	29.4	72	22.3	66	18.9	53	13	080		28.63			29.74	AA		29.80

Dynamically generated Fri Oct 12 14:07:52 EDT 2012 via http://cdo.ncdc.noaa.gov/qclcd/QCLCD

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)

HOURLY OBSERVATIONS TABLE
WILLIAMS GATEWAY AIRPORT (23104)
PHOENIX, AZ
(08/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1382 ft. above sea level
Latitude: 33.3
Longitude: -111.666
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0015	0	CLR	10.00		99	37.0	71	21.8	57	14.0	25	3	040		28.33			M	AA		29.79
03	0035	0	CLR	10.00		97	36.0	72	22.1	59	15.0	28	0	000		28.32			M	AA		29.78
03	0055	0	CLR	10.00		99	37.0	71	21.8	57	14.0	25	0	000		28.33			M	AA		29.79
03	0115	0	CLR	10.00		95	35.0	74	23.2	64	18.0	36	22	160		28.34			M	AA		29.80
03	0135	0	BKN006	2.00	HZ	97	36.0	72	22.1	59	15.0	28	20	180	25	28.36			M	AA		29.82
03	0155	0	BKN010 BKN013	4.00	HZ	97	36.0	72	22.1	59	15.0	28	17	180		28.36			M	AA		29.82
03	0215	0	CLR	7.00		97	36.0	71	21.5	57	14.0	26	16	190	24	28.37			M	AA		29.83
03	0235	0	SCT120	7.00		97	36.0	72	22.1	59	15.0	28	11	130		28.39			M	AA		29.85
03	0255	0	SCT120	10.00		88	31.0	71	21.8	63	17.0	43	14	140		28.39			M	AA		29.85
03	0315	0	CLR	10.00		90	32.0	71	21.5	61	16.0	38	16	150		28.39			M	AA		29.85
03	0335	0	CLR	10.00		90	32.0	72	22.1	63	17.0	41	11	140		28.38			M	AA		29.84
03	0355	0	CLR	10.00		90	32.0	72	22.1	63	17.0	41	8	130		28.38			M	AA		29.84
03	0415	0	CLR	10.00		88	31.0	72	22.1	64	18.0	45	8	140		28.38			M	AA		29.84
03	0435	0	CLR	10.00		88	31.0	72	22.1	64	18.0	45	8	110		28.38			M	AA		29.84
03	0455	0	CLR	10.00		88	31.0	72	22.1	64	18.0	45	7	120		28.38			M	AA		29.84
03	0515	0	CLR	10.00		86	30.0	71	21.8	64	18.0	48	6	140		28.38			M	AA		29.84
03	0535	0	CLR	10.00		88	31.0	72	22.1	64	18.0	45	3	130		28.38			M	AA		29.84
03	0549	0	SCT120 BKN200	20.00		88	31.0	72	22.1	64	18.0	45	0	000		28.39			M	AA		29.85
03	0647	0	SCT100 BKN200	45.00		90	32.0	74	23.1	66	19.0	45	6	110		28.42			M	AA		29.88
03	0747	0	SCT100 BKN200	45.00		93	34.0	72	22.0	61	16.0	34	10	150		28.43			M	AA		29.89
03	0847	0	SCT100 BKN200	45.00		97	36.0	73	22.6	61	16.0	30	9	180		28.44			M	AA		29.90
03	0947	0	SCT100 BKN200	45.00		100	38.0	74	23.1	61	16.0	28	10	120		28.43			M	AA		29.89
03	1047	0	SCT100 BKN200	45.00		102	39.0	74	23.3	61	16.0	26	6	180		28.42			M	AA		29.88
03	1147	0	SCT100 BKN200	45.00		102	39.0	72	22.3	57	14.0	23	5	180		28.41			M	AA		29.87
03	1242	0	SCT100 BKN200	45.00		106	41.0	73	22.9	57	14.0	20	6	140		28.38			M	AA		29.84
03	1450	0	SCT120 BKN200	45.00		108	42.0	72	22.4	54	12.0	17	5	250		28.32			M	AA		29.78
03	1547	0	SCT120 BKN200	45.00		108	42.0	72	22.4	54	12.0	17	8	280		28.30			M	AA		29.76
03	1648	0	SCT100 BKN200	45.00		108	42.0	72	22.4	54	12.0	17	3	270		28.27			M	AA		29.73
03	1750	0	BKN120 BKN200	45.00		108	42.0	72	22.4	54	12.0	17	0	000		28.27			M	AA		29.73
03	1847	0	BKN120 BKN200	45.00		106	41.0	73	22.9	57	14.0	20	7	140		28.28			M	AA		29.74
03	1947	0	BKN	20.00		102	39.0	M	M	55	13.0	M	10	110	17	M			M	AA		29.76
03	1955	0	CLR	10.00		100	38.0	70	21.2	54	12.0	21	14	110		28.31			M	AA		29.77
03	2015	0	CLR	10.00	VCTS	100	38.0	69	20.8	52	11.0	20	9	070		28.32			M	AA		29.78
03	2035	0	CLR	10.00		100	38.0	69	20.8	52	11.0	20	14	080	18	28.31			M	AA		29.77
03	2055	0	CLR	10.00		100	38.0	69	20.8	52	11.0	20	9	140		28.32			M	AA		29.78
03	2115	0	CLR	10.00		97	36.0	70	21.0	55	13.0	24	8	170		28.33			M	AA		29.79
03	2135	0	SCT120	7.00		97	36.0	70	21.0	55	13.0	24	10	290	20	28.36			M	AA		29.82
03	2155	0	SCT120	10.00	VCTS	97	36.0	72	22.1	59	15.0	28	10	320		28.38			M	AA		29.84
03	2215	0	CLR	5.00	VCTSHZ	97	36.0	70	21.0	55	13.0	24	23	020	28	28.38			M	AA		29.84
03	2235	0	SCT120	7.00		97	36.0	71	21.5	57	14.0	26	21	010	26	28.39			M	AA		29.85
03	2255	0	SCT006 OVC120	1.75	VCTSHZ	91	33.0	71	21.7	61	16.0	37	20	320	32	28.44			M	AA		29.90
03	2315	0	SCT120	10.00	-TSRA	88	31.0	71	21.8	63	17.0	43	17	360		28.42			M	AA		29.88
03	2335	0	SCT038 SCT048 BKN065	10.00	-RA	86	30.0	71	21.8	64	18.0	48	11	080		28.39			M	AA		29.85
03	2355	0	CLR	10.00	VCTS	88	31.0	72	22.1	64	18.0	45	10	130		28.39			M	AA		29.85

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final) HOURLY OBSERVATIONS TABLE LUKE AFB AIRPORT (23111) GLENDALE, AZ (08/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1085 ft. above sea level
Latitude: 33.55
Longitude: -112.366
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0055	0	CLR	10.00		96	35.6	71	21.7	58	14.2	28	6	320		28.59			29.63	AA		29.74
03	0155	0	CLR	10.00		93	33.8	71	21.8	60	15.7	33	5	210		28.60	1	005	29.64	AA		29.75
03	0255	0	CLR	10.00		90	32.3	72	22.2	63	17.4	41	6	070		28.61			29.65	AA		29.76
03	0355	0	CLR	6.00	HZ	93	33.9	71	21.8	60	15.4	33	0	000		28.62			29.66	AA		29.77
03	0455	0	CLR	6.00		90	32.0	M	M	61	16.0	M	0	000		M	1	012	29.68	AA		29.79
03	0457	0	CLR	10.00		90	32.0	71	21.6	61	16.0	38	2	310		28.62	1	005	29.73	AA		29.77
03	0555	0	CLR	10.00		90	32.0	71	21.6	61	16.0	38	0	000		28.66			29.77	AA		29.81
03	0655	0	CLR	10.00		90	32.4	71	21.9	62	16.5	39	0	000		28.67			29.72	AA		29.82
03	0755	0	CLR	10.00		94	34.5	72	21.9	60	15.8	32	0	000		28.69	1	017	29.73	AA		29.84
03	0855	0	CLR	10.00		96	35.6	72	22.2	60	15.5	30	5	090		28.69			29.74	AA		29.84
03	0955	0	CLR	10.00		99	37.3	72	22.4	59	15.2	27	5	130		28.69			29.73	AA		29.84
03	1055	0	CLR	10.00		102	38.7	73	22.9	59	15.1	24	8	100		28.68	8	002	29.72	AA		29.83
03	1155	0	CLR	10.00		102	39.1	73	22.8	59	15.2	24	0	000		28.66			29.70	AA		29.81
03	1255	0	CLR	10.00		105	40.4	74	23.3	59	15.2	22	7	190		28.63			29.67	AA		29.78
03	1355	0	CLR	10.00		108	42.2	75	23.7	59	14.8	20	6	VR		28.60	8	027	29.64	AA		29.75
03	1455	0	CLR	10.00		110	43.2	75	23.7	58	14.5	18	9	240		28.56			29.60	AA		29.71
03	1555	0	CLR	10.00		111	44.0	74	23.4	56	13.3	17	11	220	20	28.54			29.57	AA		29.69
03	1655	0	CLR	10.00		111	43.8	74	23.4	56	13.2	17	11	190	17	28.51	6	028	29.55	AA		29.66
03	1755	0	CLR	10.00		109	42.5	74	23.3	57	13.9	18	11	170		28.50			29.55	AA		29.65
03	1855	0	FEW170 SCT190	10.00		108	42.3	73	22.7	55	12.9	17	9	190		28.51			29.56	AA		29.66
03	1915	0	SCT130 SCT170	10.00	TS	106	41.0	72	22.4	55	13.0	19	7	300		28.52			M	AA		29.67
03	1942	0	BKN130CB BKN190	10.00	VCTS	106	41.0	72	22.4	55	13.0	19	10	280	16	28.53			M	AA		29.68
03	1955	0	SCT130CB SCT150 BKN250	10.00	VCTS	104	40.1	73	22.6	57	14.0	21	11	240		28.56	3	014	29.60	AA		29.71
03	2055	0	BKN140 BKN170	10.00		101	38.6	73	23.0	60	15.6	26	14	080	21	28.60			29.64	AA		29.75
03	2108	0	OVC130	10.00		95	35.0	73	22.9	63	17.0	35	24	050	30	28.61			29.66	AA		29.76
03	2155	0	BKN170	10.00		92	33.5	72	22.2	62	16.8	37	18	060		28.62			29.67	AA		29.77
03	2255	0	CLR	10.00		91	32.7	73	22.6	64	17.9	41	6	010		28.65	1	032	29.70	AA		29.80
03	2355	0	CLR	10.00		89	31.9	72	22.3	64	17.7	44	7	010		28.67			29.72	AA		29.82

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)

HOURLY OBSERVATIONS TABLE
CHANDLER MUNICIPAL AIRPORT (53128)
CHANDLER, AZ
(08/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1243 ft. above sea level
Latitude: 33.268
Longitude: -111.812
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0547	0	BKN150 BKN200	40.00		88	31.0	70	21.2	61	16.0	40	8	240		28.50			M	AA		29.82
03	0647	0	FEW150 BKN200	40.00		86	30.0	71	21.8	64	18.0	48	6	VR		28.53			M	AA		29.85
03	0747	0	FEW150 SCT200	40.00		90	32.0	69	20.4	57	14.0	33	8	100		28.54			M	AA		29.86
03	0847	0	SCT150 SCT210	40.00		91	33.0	69	20.6	57	14.0	32	9	090		28.55			M	AA		29.87
03	0947	0	SCT120 BKN200	40.00		93	34.0	69	20.4	55	13.0	28	6	VR		28.46			M	AA		29.78
03	1047	0	FEW120 BKN200	40.00		97	36.0	71	21.6	57	14.0	26	0	000		28.53			M	AA		29.85
03	1147	0	FEW120 BKN200	40.00		100	38.0	72	22.0	57	14.0	24	5	VR		28.52			M	AA		29.84
03	1251	0	SCT120 BKN180	40.00		102	39.0	71	21.8	55	13.0	21	6	160		28.49			M	AA		29.81
03	1352	0	SCT100 SCT180	40.00		106	41.0	72	22.2	54	12.0	18	9	150	17	28.46			M	AA		29.78
03	1447	0	FEW100 SCT180	40.00		108	42.0	73	22.5	54	12.0	17	7	150		28.43			M	AA		29.74
03	1547	0	FEW100 SCT180	40.00		108	42.0	73	22.5	54	12.0	17	8	230		28.40			M	AA		29.72
03	1650	0	FEW100 SCT150 SCT200	40.00		108	42.0	72	22.4	54	12.0	17	6	130		28.38			M	AA		29.69
03	1750	0	FEW100 BKN200	40.00		106	41.0	72	22.2	54	12.0	18	9	150		28.38			M	AA		29.69
03	1847	0	SCT120 BKN200	40.00		102	39.0	71	21.6	54	12.0	20	7	200		28.39			M	AA		29.70
03	1947	0	SCT120 BKN200	15.00		99	37.0	71	21.9	57	14.0	25	9	120		28.42			M	AA		29.73
03	2047	0	SCT120 BKN200	15.00		97	36.0	70	21.0	55	13.0	24	15	120		28.43			M	AA		29.75

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
CASA GRANDE MUNICIPAL ARPT (03914)
CASA GRANDE, AZ
(08/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1462 ft. above sea level
Latitude: 32.95
Longitude: -111.766
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0335	0	CLR	10.00		90	32.0	69	20.4	57	14.0	33	7	130		28.30			M	AA		29.85
03	0355	0	CLR	10.00		88	31.0	69	20.6	59	15.0	38	0	000		28.29			M	AA		29.84
03	0415	0	CLR	10.00		88	31.0	69	20.6	59	15.0	38	0	000		28.28			M	AA		29.83
03	0435	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	0	000		28.28			M	AA		29.83
03	0455	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	0	000		28.28			M	AA		29.83
03	0515	0	CLR	10.00		86	30.0	67	19.2	55	13.0	35	0	000		28.30			M	AA		29.85
03	0535	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	0	000		28.30			M	AA		29.85
03	0555	0	CLR	10.00		88	31.0	67	19.5	55	13.0	33	7	130		28.30			M	AA		29.85
03	0615	0	CLR	10.00		88	31.0	67	19.5	55	13.0	33	0	000		28.31			M	AA		29.86
03	0635	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	11	120	17	28.32			M	AA		29.87
03	0655	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	7	130		28.33			M	AA		29.88
03	0715	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	3	120		28.33			M	AA		29.88
03	0735	0	CLR	10.00		88	31.0	68	20.1	57	14.0	35	5	150		28.33			M	AA		29.88
03	0755	0	CLR	10.00		90	32.0	69	20.4	57	14.0	33	0	000		28.34	2	020	M	AA		29.89
03	0815	0	CLR	10.00		91	33.0	69	20.6	57	14.0	32	8	140		28.34			M	AA		29.89
03	0835	0	CLR	10.00		93	34.0	70	20.9	57	14.0	30	10	150		28.34			M	AA		29.89
03	0855	0	CLR	10.00		91	33.0	69	20.6	57	14.0	32	11	120		28.34			M	AA		29.89
03	0935	0	CLR	10.00		93	34.0	70	20.9	57	14.0	30	7	140		28.34			M	AA		29.89
03	0955	0	CLR	10.00		93	34.0	70	20.9	57	14.0	30	8	140		28.34			M	AA		29.89
03	1015	0	CLR	10.00		93	34.0	70	20.9	57	14.0	30	7	160		28.34			M	AA		29.89
03	1035	0	CLR	10.00		93	34.0	70	20.9	57	14.0	30	7	140		28.34			M	AA		29.89
03	1055	0	CLR	10.00		95	35.0	70	21.2	57	14.0	28	3	150		28.34	4	000	M	AA		29.89
03	1355	0	CLR	10.00		102	39.0	72	22.3	57	14.0	23	9	160		28.27	7	027	M	AA		29.81
03	1415	0	CLR	10.00		104	40.0	73	22.6	57	14.0	21	8	160		28.25			M	AA		29.79
03	1455	0	CLR	10.00		106	41.0	72	22.4	55	13.0	19	0	000		28.24			M	AA		29.78
03	1515	0	CLR	10.00		106	41.0	72	22.4	55	13.0	19	0	000		28.22			M	AA		29.76
03	1535	0	CLR	10.00		104	40.0	72	22.1	55	13.0	20	0	000		28.22			M	AA		29.76
03	1555	0	CLR	10.00		104	40.0	72	22.1	55	13.0	20	0	000		28.21			M	AA		29.75
03	1635	0	CLR	10.00		104	40.0	72	22.1	55	13.0	20	3	220		28.20			M	AA		29.74
03	1655	0	CLR	10.00		104	40.0	72	22.1	55	13.0	20	0	000		28.20			M	AA		29.74
03	1715	0	CLR	10.00		104	40.0	72	22.1	55	13.0	20	0	000		28.20			M	AA		29.74
03	1735	0	CLR	10.00		104	40.0	72	22.1	55	13.0	20	3	200		28.19			M	AA		29.73
03	1755	0	CLR	10.00		102	39.0	71	21.8	55	13.0	21	0	000		28.19			M	AA		29.73
03	1815	0	CLR	10.00		102	39.0	71	21.8	55	13.0	21	0	000		28.19			M	AA		29.73
03	1835	0	CLR	10.00		102	39.0	71	21.8	55	13.0	21	0	000		28.19			M	AA		29.73
03	1855	0	CLR	10.00		102	39.0	71	21.8	55	13.0	21	0	000		28.20			M	AA		29.74
03	1915	0	CLR	10.00		100	38.0	72	22.0	57	14.0	24	8	260		28.22			M	AA		29.76
03	1935	0	FEW120	10.00		99	37.0	71	21.8	57	14.0	25	7	270		28.22			M	AA		29.76
03	1955	0	FEW120	10.00		99	37.0	71	21.8	57	14.0	25	0	000		28.22			M	AA		29.76
03	2015	0	FEW120	10.00		99	37.0	71	21.8	57	14.0	25	8	040		28.24			M	AA		29.78
03	2035	0	CLR	10.00		99	37.0	70	21.3	55	13.0	23	10	050		28.24			M	AA		29.78
03	2055	0	CLR	10.00		99	37.0	70	21.3	55	13.0	23	13	070		28.24			M	AA		29.78
03	2115	0	CLR	10.00		97	36.0	70	21.0	55	13.0	24	13	090		28.25			M	AA		29.80
03	2135	0	CLR	10.00		97	36.0	70	21.0	55	13.0	24	10	080		28.25			M	AA		29.80
03	2155	0	CLR	10.00		95	35.0	69	20.7	55	13.0	26	10	110		28.25			M	AA		29.80
03	2215	0	SCT120	10.00		95	35.0	69	20.7	55	13.0	26	10	100		28.27			M	AA		29.81
03	2235	0	OVC110	10.00	VCTS	93	34.0	69	20.4	55	13.0	28	0	000		28.30			M	AA		29.85
03	2255	0	OVC110	10.00		93	34.0	69	20.4	55	13.0	28	18	340	30	28.33	2	041	M	AA		29.88
03	2315	0	BKN120	10.00	TS	84	29.0	69	20.5	61	16.0	46	21	050	29	28.31			M	AA		29.86
03	2335	0	FEW120	10.00	VCTS	84	29.0	69	20.5	61	16.0	46	18	060	28	28.29			M	AA		29.84
03	2355	0	CLR	10.00		88	31.0	69	20.6	59	15.0	38	20	050	24	28.28			M	AA		29.83

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WWUS75 KPSR 030755
NPWPSR
URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE PHOENIX AZ
1255 AM MST WED AUG 3 2011
AZZ023-028-032000-
/O.NEW.KPSR.DS.W.0010.110803T0755Z-110803T0900Z/
/O.CON.KPSR.EH.W.0006.000000T0000Z-110805T0300Z/
GREATER PHOENIX AREA-NORTHWEST AND NORTH CENTRAL PINAL COUNTY-
INCLUDING THE CITIES OF...BUCKEYE...MESA...PHOENIX...
APACHE JUNCTION...CASA GRANDE...FLORENCE
1255 AM MST WED AUG 3 2011
...DUST STORM WARNING IN EFFECT UNTIL 2 AM MST EARLY THIS
MORNING...
...EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 8 PM MST
THURSDAY...
THE NATIONAL WEATHER SERVICE IN PHOENIX HAS ISSUED A DUST STORM
WARNING...WHICH IS IN EFFECT UNTIL 2 AM MST EARLY THIS MORNING.
THE DUST STORM WARNING INCLUDES THE AREAS FROM CASA GRANDE TO
PHOENIX...INCLUDING PORTIONS OF NEARBY INTERSTATE 10. AT 1245 AM
THERE WERE REPORTS OF 1/4 MILE VISIBILITIES IN BLOWING DUST NEAR
CASA GRANDE...EMBEDDED IN AN AREA OF 25 TO 35 MPH WINDS MOVING NORTH
TOWARD PHOENIX.
AN EXCESSIVE HEAT WARNING REMAINS IN EFFECT UNTIL 8 PM MST
THURSDAY.
* AFFECTED AREA: YUMA AND THE LOWER COLORADO RIVER VALLEY...
  YUMA COUNTY...LA PAZ COUNTY...MARICOPA COUNTY INCLUDING THE
  GREATER PHOENIX AREA...NORTHWEST AND NORTH-CENTRAL PINAL
  COUNTY INCLUDING CASA GRANDE.
* LOCATIONS INCLUDE: GILA BEND...TACNA...WELLTON...FORTUNA
  FOOTHILLS...YUMA...BUCKEYE...MESA...PHOENIX... NEW RIVER...
  WICKENBURG...QUARTZSITE...SALOME...EHRENBERG... PARKER...
  APACHE JUNCTION...CASA GRANDE...FLORENCE...BLYTHE
* TEMPERATURE: HIGHS GENERALLY 111 TO 116 DEGREES WITH
  OVERNIGHT LOWS ONLY DROPPING INTO THE UPPER 80S TO NEAR 90
  DEGREES IN THE WARMEST URBAN AREAS INCLUDING PHOENIX AND
  YUMA.
* IMPACTS: EXCESSIVELY HOT WEATHER CAN BE STRESSFUL...MAKING IT
  HARD FOR THE BODY TO ACCLIMATE AND REMAIN HYDRATED.
  EXTREMELY WARM OVERNIGHT LOW TEMPERATURES DO NOT ALLOW THE
  BODY TO COOL DOWN PROPERLY OVERNIGHT...AND CAN MAKE EXTREME
  HEAT EVEN MORE DANGEROUS.
PRECAUTIONARY/PREPAREDNESS ACTIONS...
TAKE EXTRA PRECAUTIONS IF YOU WORK OR SPEND TIME OUTSIDE. WHEN
POSSIBLE...RESCHEDULE STRENUOUS ACTIVITIES TO EARLY MORNING OR
EVENING. KNOW THE SIGNS AND SYMPTOMS OF HEAT EXHAUSTION AND HEAT
STROKE. WEAR LIGHT WEIGHT AND LOOSE FITTING CLOTHING WHEN
POSSIBLE AND DRINK PLENTY OF WATER. IF YOU WEAR A WIDE-BRIMMED
HAT...YOUR HEAD AND BODY WILL BE MUCH COOLER.
TO REDUCE RISK DURING OUTDOOR WORK...THE OCCUPATIONAL SAFETY AND
HEALTH ADMINISTRATION RECOMMENDS SCHEDULING FREQUENT REST BREAKS
IN SHADED OR AIR CONDITIONED ENVIRONMENTS. ANYONE OVERCOME BY
HEAT SHOULD BE MOVED TO A COOL AND SHADED LOCATION. HEAT STROKE
IS AN EMERGENCY...CALL 9 1 1.
A DUST STORM WARNING IS ISSUED WHEN WINDS HAVE GENERATED LARGE
AREAS OF BLOWING DUST OR BLOWING SAND THAT HAVE SUBSTANTIALLY
REDUCED VISIBILITIES...TO 1/4 MILE OR LESS...RESULTING IN
HAZARDOUS DRIVING CONDITIONS IN SOME AREAS. BE READY FOR A SUDDEN
DROP IN VISIBILITY TO NEAR ZERO. USE EXTRA CAUTION AND SLOW DOWN
WHILE DRIVING...AS OBJECTS ON AND NEAR ROADWAYS WILL BE SEEN ONLY
AT CLOSE RANGE. IF YOU ENCOUNTER BLOWING DUST OR BLOWING SAND ON
THE ROADWAY OR SEE IT APPROACHING...PULL OFF THE ROAD AS FAR AS
POSSIBLE AND PUT YOUR VEHICLE IN PARK. TURN THE LIGHTS ALL THE

WAY OFF AND KEEP YOUR FOOT OFF THE BRAKE PEDAL.
&&
$$

APPENDIX C

NOTICE OF PUBLIC COMMENT PERIOD

ADEQ Arizona Department of Environmental Quality
Janice K. Brewer, Governor
Henry R. Darwin, Director

PUBLIC NOTICE

Request for Public Comments on Exceptional Events in the Greater Phoenix Area

In 2005, Congress identified a need to account for events that result in exceedances of the National Ambient Air Quality Standards (NAAQS) that are exceptional in nature (e.g., not expected to reoccur or caused by acts of nature beyond man-made controls.) In response, EPA promulgated the Exceptional Events Rule (EER) to address exceptional events in 40 CFR Parts 50 and 51 on March 22, 2007 (72 FR 13560). On May 2, 2011, EPA released draft guidance documents on the implementation of the EER to State, tribal and local air agencies for review. The EER allows for states and tribes to "flag" air quality monitoring data as an exceptional event. If flagged, these data can be excluded from consideration in air quality planning if EPA concurs with the demonstration submitted by the flagging agency documenting that all procedural and technical requirements have been met.

Pursuant to 40 CFR 50.14(c)(3)(i), the Arizona Department of Environmental Quality (ADEQ) is soliciting comments on its final demonstrations of events that have caused elevated concentrations of PM_{10} in the Greater Phoenix area on February 19; July 18; August 3; August 18; August 25 through 28; September 2; October 4; November 4, 2011; January 21 – 22 and February 27, 2012. ADEQ has decided to flag these episodes based on these analyses. Copies of the demonstrations are available for review beginning Monday, December 3, 2012, on the ADEQ website at www.azdeq.gov/environ/air/plan/. Interested parties can submit written comments throughout the comment period which will end at 5:00 p.m. on Tuesday, January 1, 2013. Any comments received will be responded to and forwarded to EPA with the final demonstrations.

Written comments should be addressed, faxed, or e-mailed to:
Andra Juniel, Air Assessment Section, Arizona Department of Environmental Quality, 1110 W. Washington Street, 3415-A, Phoenix, AZ 85007, PHONE: (602) 771-4417; FAX: (602) 771-2366, E-mail: juniel.andra@azdeq.gov.

In addition to being available on-line, copies of the analyses are available for review, Monday through Friday, 8:30 a.m. to 4:30 p.m., at the ADEQ Records Center, 1110 W. Washington St., Phoenix, AZ, 85007, Attn: David Olivo, (602) 771-4380, email: olivo.david@azdeq.gov.

Persons with a disability may request reasonable accommodations by contacting Linda Morrison at (602) 771-4793 or 1-800-234-5677 ext. 771-4793. This document is available in alternative formats by contacting ADEQ TDD phone number at (602) 771-4829.